AMERICAN ANTIQUITY

A Quarterly Review of American Archaeology

W. C. McKERN, *Editor*

Wendell C. Bennett, Henry B. Collins, Jr., Thorne Deuel, E. W. Gifford, James B. Griffin, Emil W. Haury, J. Alden Mason, W. A. Ritchie, F. H. H. Roberts, Jr., Wm. S. Webb, and Waldo R. Wedel, *Assistant Editors*

VOL. II

Menasha, Wisconsin, U. S. A.

Published by

THE SOCIETY FOR AMERICAN ARCHAEOLOGY

1936–7

museum
Anthropology
Direct
9-22-37

CONTENTS OF VOLUME II

ARTICLES

Editorials 1
An Archaeological Reconnaissance of the Middle and Lower Yukon Valley, Alaska. FREDERICA DE LAGUNA 6
Another Mayan Hieroglyph for "Day." HERMANN BEYER . . 13
Dating the Eruption of Sunset Crater, Arizona. JOHN C. MCGREGOR 15
Shell Trumpet from Arizona. HENRY J. BOEKELMAN 27
A Method of Determining the Texture of Pottery. LYNDON L. HARGRAVE and WATSON SMITH 32
Editorials 85
Pottery Study in the Maya Area. MARY BUTLER 89
Aerial Photography and Archaeology. DACHE M. REEVES . . 102
Prospects in California Prehistory. A. L. KROEBER 108
A Shell Bracelet Manufactory. ARTHUR WOODWARD 117
The Archaeology of Ludlow Cave and Its Significance. W. H. OVER 126
Editorials 169
New World Man. FRANK H. H. ROBERTS, JR. 172
The Occurrence of Coiled Pottery in New York State. CHARLES FAIRBANKS 178
The Archaeological Remains of the Chiwere Sioux. JAMES B. GRIFFIN 180
Culture Influences from Ohio in New York Archaeology. WILLIAM A. RITCHIE 182
Notes on Archaeological Surveys. DACHE M. REEVES . . . 195
A Suggested Projectile-Point Classification. J. JOE FINKELSTEIN . 197
Editorials 245
Archaeological Work in South America. WENDELL C. BENNETT . 248
Association of Man with Pleistocene Mammals in the Sandia Mountains, New Mexico. FRANK C. HIBBEN 260
A Stone Carving in Bas-relief from the Upper Gila Area. P. H. NESBITT 264
Notes on Cultural Relations between Asia and America. N. C. NELSON 267
The Chronological Position and Ethnological Relationships of the Fort Ancient Aspect. JAMES B. GRIFFIN 273

The Preservation of Textile Remains. J. D. LAUDERMILK . . 277
A Pre-Spanish Rubber Ball from Arizona. EMIL W. HAURY . . 282

MEETINGS AND REPORTS

Southwestern Division of the American Association for the Advancement of Science (Flagstaff) 50
Third Plains Archaeological Conference (Mt. Vernon) . . . 221
Annual Meeting, Society for American Archaeology 289

CORRESPONDENCE

Archaeological Blundering. EDGAR B. HOWARD 37
Survey Methods. P. SCHUYLER MILLER. 38
Should We Damn the Press? T. M. N. LEWIS 38
Former Indian Sites in Maryland, as Located by Early Colonial Records. WILLIAM B. MARYE 40
The Archaeological Attitude. HERBERT W. KUHM. 46
Apology. A. V. KIDDER 130
Mountain Sheep Effigies. MALCOLM B. CUMMINGS 130
Credit to Previous Investigators. WARREN KING MOOREHEAD . 132
The Birdstone and Its Probable Use. RALPH H. WHITEHEAD . 134
Stoppers or Modeling Tools. THOMAS J. DILLINGHAM . . . 137
"Cell-Tempered" Pottery. ANNA O. SHEPARD 137
Metallographic Study of Copper Artifacts. ANNA O. SHEPARD . 139
Survey Methods. ARTHUR WOODWARD 140
The Looping Technique in Netting. ERNESTINE WIEDER SINGER 141
On Pottery Restoration. FRED CARDER 142
Standardized Terminology. ARTHUR WOODWARD 143
A Porcelain Baton. E. F. GREENMAN 204
Unanswered Questions on Ludlow Cave. WM. DUNCAN STRONG . 205
Stoppers or Modeling Tools. E. W. GIFFORD 207
Organized Amateur Students. MAURICE ROBBINS 207
The Use of the Thumb-Scraper. W. H. OVER 208
Burial Methods in Maryland and Adjacent States. WM. B. MARYE 209
The Iroquois and the Birdstone. WM. A. RITCHIE 214
Regarding Knotted Looping. HORACE MINER 215
Two Probable Shell Trumpets from Ontario. HENRY J. BOEKELMAN 295
Culture Identity of the Ozark "Top Layer." JAMES B. GRIFFIN . 296
Reversed Stratigraphy. FLORENCE M. HAWLEY 297

Credit to Professor Moorehead. ERNEST E. TYZZER 299
Southwestern Trade in Shell Products. DONALD D. BRAND . . 300
Probable Use of Flint End-Scrapers. CYRUS N. RAY 303

NOTES AND NEWS

Arctic Area. U. S. National Museum: Alaska, 47.

Pacific Coast Area. University of Oregon, 47. Santa Barbara Museum (California), 47. Santa Rosa Junior College (California), 48.

Southwestern Area. University of New Mexico, 48. The Laboratory of Anthropology (Santa Fe), 49. Southwestern Division A.A.A.S., 50. Tree-Ring Conference, 50. Pueblo Grande (Phoenix), 51.

Great Plains Area. University of Oklahoma, 52. Nebraska State Historical Society, 52. University of Nebraska, 52.

Northern Mississippi Area. University of Wisconsin—Milwaukee Public Museum, 53.

Northeastern Area. New York State Archaeological Association, 53. Rochester Museum, 54. Phillips Academy: New England, 54. Museum of the American Indian: Vermont, 54. Pennsylvania Historical Commission, 55. National Museum of Canada, 55.

Middle America. American Philosophical Society: Mexico, 55. Carnegie Institution: Maya, 56; Mexico, Central America, 57.

South America. Andean field survey, 58.

Early Man. University Museum (Philadelphia)—Philadelphia Academy of Sciences: New Mexico, 58. Carnegie Institution —Academy of Natural Sciences: New Mexico, 58. Great Plains, 59. University of Nebraska, 59. Bureau of American Ethnology: Colorado, 59. Southwest Museum: Mohave Desert, 59. University of Denver: Plains, 60. University of Minnesota, 60.

General. Hodge Fund publication, 145. *Maya Research*, 145.

Southwest Area. Arizona State Museum, 146.

Great Plains Area. Nebraska State Historical Society: Nebraska and Kansas, 146.

Northern Mississippi Area. University of Wisconsin—Milwaukee Museum, 147.

Southwestern Area. Archaeological Society of North Carolina, 148.

Middle American Area. American Philosophical Society: Mexico, 148. Archaeology in northern Mexico, 149. University of California: northern Mexico, 151. Direction of Prehispanic Monuments of the Mexican Government, 152. Monte Alban and Mitla, 154. American Museum of Natural History: Valley of Mexico, 154. Ethnographical Museum of Sweden: Mexico, 155. Mexico, 156. Carnegie Institution: Maya, 157. University Museum (Philadelphia): Maya, 158. Bureau of American Ethnology—Peabody Museum (Harvard): Honduras, 159. Peabody Museum (Yale): Haiti, 160. Publications, 161.

Pacific Coast Area. Southwest Museum, 217.

Southwestern Area. Northern Arizona State Teachers College—Museum of Northern Arizona, 217. University of Utah, 217. Gila Pueblo, 218. Logan Museum (Beloit): New Mexico, 218. University of Arizona, 219. Pueblo Grande (Phoenix), 219. Peabody Museum (Harvard): Arizona, 220. Laboratory of Anthropology (Santa Fe), 220. Southwest Museum: Nevada, 221; California, 221. Peabody Museum (Harvard): Southwest pottery, 221.

Great Plains Area. Mt. Vernon conference, 221. University of Nebraska, 222.

Northern Mississippi Area. Iowa archaeological survey, 223. University of Chicago: Illinois, 224. Jersey County, Illinois, 225. Ohio State Museum, 225.

Northeastern Area. National Museum of Canada: Ontario, 225. Ontario, 226. Phillips Academy: Maine, 226. Museum of the American Indian: Vermont, 226; Oklahoma, 226. Alfred M. Tozzer, 226. Rochester Museum, 226. Eastern States Archeological Federation, 227. New Jersey State Museum, 227.

Middle American Area. Peabody Museum (Yale): Puerto Rico, 227. Monte Alban, 228.

South American Area. National Museum of Peru, 229. American Museum of Natural History: Peru, 230. Chile, 230. San Marcos University (Lima), 230.

Early Man in America. Nebraska State Museum, 231. Gila Pueblo, 231. San Diego Museum, 231. Southwest Museum: Nevada, 232.

Obituary. Cornelius B. Cosgrove, 232.

Arctic Area. University of Alaska, 307. National Geographic Society—Smithsonian Institution: Alaska, 307.
Southwestern Area. University of New Mexico, 308; Mexico, 308.
Great Plains Area. Nebraska State Historical Society, 309; Kansas, 310. University of Nebraska, 311.
Northern Mississippi Area. University of Michigan: Ohio Valley, 311. University of Chicago: Mississippi Valley, 311. Missouri, 311.
Northeastern Area. New York State Archaeological Association, 311. Pennsylvania Historical Commission, 313. University Museum (Philadelphia): pottery analysis, 313.
Southeastern Area. University of Tennessee, 314.
South American Area. Boston College Museum—University Museum (Philadelphia): Colombia, 315. Peru, 315. Institute of Andean Research, 316.
General. Colorado Museum of Natural History, 316. S. A. A. regional meeting, 316.

BOOK REVIEWS

RENAUD: *The Archaeological Survey of the High Western Plains* (*Van Royen*) 61
VAILLANT: *Excavations at Zacatenco; Excavations at Ticoman* (*Butler*) 63
VAILLANT: *Excavations at El Arbolillo* (*Butler*) 66
VAILLANT: *Early Cultures of the Valley of Mexico* (*Butler*) 68
RITCHIE: *New Evidence Relating to the Archaic Occupation of New York* (*Johnson*) 162
FORD: *Ceramic Decoration Sequence at an Old Indian Village Site near Sicily Island, Louisiana* (*Clements*) 163
HAURY: *The Mogollon Culture of Southwestern New Mexico* (*Martin*) 233
BENNETT: *Excavations in Bolivia* (*Fischel*) 234
FISHER: *The Relation of North American Prehistory to Post-Glacial Climatic Fluctuations* (*Richardson*) 237
PATTERSON: *The Corner-Tang Flint Artifacts of Texas* (*Ray*) 241
ROBERTS: *Additional Information on the Folsom Complex* (*Nelson*). 317
BLACK: *Excavation of the Nowlin Mound* (*Setzler*) 320
KIDDER and SHEPARD: *The Pottery of Pecos, Volume II* (*Guthe*) ... 322
SHEPARD: *The Technology of Pecos Pottery* (*Matson*) 325

Upper North America, 70. Middle America, 71. General, 72. Upper North America, 165. Middle America, 167. South America, 167. Early Man in America, 167. General, 167. Upper North America, 243. Middle America, 244. South America, 244. Early Man, 244. General, 244. Upper North America, 328. Middle America, 329. South America, 329. Early Man, 329. General, 330.

Index 338

Museum
Anthropology
Library
9-22-39

AMERICAN ANTIQUITY

VOL. II JULY, 1936 No. 1

EDITORIALS

ERRATUM . . . We hereby acknowledge an error of omission in the April issue of this journal: Volume I, Number 4. The illustrations for the article by Mrs. Elizabeth W. Crozer Campbell: *Archaeological Problems in the Southern California Deserts*, Plates 20–27, inclusive, are reproductions of photographs by Arnold of Pasadena, California. For this erratum we offer our sincere apology to Mrs. Campbell and the photographer.

DESTRUCTIVE FIELD WORK . . . To a majority of the students of American archaeology, the arrival of spring and summer brings with it a pleasurable hope for, or anticipation of field activities. Human curiosity, the ultimate source of science, and the lure of the outdoors combine to create within one's mind an urge, comparable to an itch, to probe after additional, possibly new information regarding the cultural peculiarities and the history of the preliterate Americans.

This urge is in itself quite worthy and entirely understandable. It can do no harm and may result in much that is good if controlled by an intelligent policy. If not so controlled, it can lead to no end of disastrous damage to the cause of archaeology. Training and experience are required to guide activities motivated by this urge into productive rather than destructive channels. The untrained man can no more expect to excavate a mound or a village site with praiseworthy results than he could hope, without proper instruction, to successfully operate for appendicitis.

To start at the very beginning, there is an incorrect and a correct attitude towards field work: that of the man who seeks "relics" for commercial profit or for his own collections, without a thought of searching for knowledge, is as incorrect as it is lamentable; that of the man who sincerely seeks to add to the available store of information, whether in measure large or minutely small, is manifestly the correct one. Presumably, all students of American archaeology, whether specialists or non-specialists, professionals or amateurs, possess the cor-

rect research attitude. It does not follow, however, that all students are familiar with proper technical methods for field research.

To illustrate, it is probably true that a large majority of the mounds in the Mississippi Valley that have been entered, regardless of by whom, have been subjected to such careless methods of excavation and data recording that practically nothing of true scientific value has, as a result, been added to our information. To quote from a recent publication on the situation in one state:

"I believe I am safe in saying, however, that these pioneers accomplished almost nothing to warrant our gratitude. So far as I have been able to learn, no records were kept of their excavations. Their work did not even approach the standards of modern archaeological methods; and their collections are of little value to the modern student, inasmuch as there is no indication as to where, when, and how the various items in the collections were obtained. They are interesting to look at and to know that they were made by Indians; but it is impossible to use them in deciphering the course of events in prehistoric Missouri."[1]

It might be added that the methods employed in much of this work were such that many important data could not possibly have been preserved against destruction. The cause of this wholesale loss to science of important information was either an unscientific attitude, resulting in methods prohibitive to the preservation of facts, or of faulty methods not permitting of a careful determining or accurate recording of data.

No student of American archaeology desires to lose or destroy facts relating to the story of preliterate man on these continents, nor would he wilfully run the risk of so doing. To a certain degree all students, including specialists, are in the same boat. It is highly doubtful if any existing research methods may be described as perfect. Improved details are constantly being inaugurated. It is incumbent upon all research students, no matter how thorough their training, or extensive their experience, to constantly exert every effort to improve technical methods. It follows that it is of relatively superlative importance that students untrained and without qualifying experience should not engage in independent ventures in field excavations. The "should not" in the preceding sentence does not reflect some arbitrary rule imposed upon common folks by self-appointed members of an archaeological brain trust, but rather a self-imposed rule dictated by the sincerity of one's interest in the progressive welfare of archaeology.

[1] Berry, J. Brewton, Archaeological Resources and Research in Missouri, Southwestern Social Science Quarterly, Vol. 16, No. 4, 1936.

It may be contended that, since one is not born with experience, a student has no opportunity to follow the dictates of his interests into the field. How is one to acquire experience? The question, a perfectly legitimate one, is easily answered; field parties under qualified directors not infrequently seek the services of inexperienced students, and worth while experience may be best acquired under the personal supervision of trained and experienced field investigators.

The season with its accompanying urge is here. Are your sincere interests in American archaeology sufficient to dictate for you the wise policy necessary to regulate your conduct along lines parallel to the best interests of your chosen science?

WCM.

POACHING ON FAMOUS SITES . . . The ability to resist the urge to excavate depends also upon the opportunities which circumstances offer. A flat plowed field on which flint implements and potsherds have been found is not hard to resist because of the absence of clues as to where to begin. A small mound or a partially exposed grave is much more enticing. The urge is always strong while visiting a locally famous site in which others have found interesting information in former years, or on a pilgrimage to some archaeological mecca such as Moundville, Cahokia, Fort Ancient, or the Mesa Verde, made famous by its spectacular character and historic significance. Fortunately many of these latter sites now are protected public parks or guarded by owners who understand their educational importance.

If the archaeologist, either professional or non-professional, is lured into "just prospecting around a bit" of a sunny afternoon, he may make quite a hole before he realizes, somewhat guiltily, that he has moved a quantity of earth.

The spot chosen in an attempt to satisfy personal curiosity contained the record of how its former occupants had lived. Now the record has been destroyed for the conditions in the deposits may have had more historic significance than the objects found. The obliteration of the record has certainly not been part of a carefully planned program of investigation. It is unlikely that the prospector is equipped with all the materials, ranging from a camera to notebooks and containers, required for an adequate transcription of the story. Probably he has neither the experience nor sufficient knowledge of the former culture to interpret accurately the evidence he has found and destroyed. The excitement of

discovery has passed, a fragment of history is gone forever, and only a vain regret remains.

The feeling of being a poacher is stronger if the student has been drawn into digging into a site being studied by another, and on which work has been stopped for a few days, or the entire season. No visitors, not even the most experienced excavator, who spends at the most only a few days at such a site, is able to translate the record he uncovers as completely as the man who has spent months in studying the conditions and in planning and executing an elaborate campaign of excavation. To the guilty feeling that a bit of history has been ruined which might have been recorded more accurately by another, is added the knowledge that the work of a colleague has been hampered, possibly seriously, in order to satisfy a personal whim.

No student of American archaeology desires to lose or destroy facts relating to the story of preliterate man on these continents, nor would he wilfully run the risk of so doing, by "just prospecting around a bit." Yet authoritative word has come that the Lindenmeier site in northern Colorado has been visited within the last few months by groups of "prospectors." On at least three occasions, groups of visitors said to be students and instructors from two or three of the educational institutions in that general region have been found digging at this site.

A chance to visit the Lindenmeier site and to be fortunate in finding a broken implement on the surface to treasure as a memento of the pilgrimage, is a natural and praiseworthy desire on the part of any archaeologist. This important site has become world famous because it is the only place so far discovered which was occupied by what is apparently one of the most ancient human groups in North America. Every student of American Indian history knows that this locality is still being excavated with the greatest of care by government archaeologists.

It seems incredible that students who are receiving training in archaeology, and who are, or should be, familiar with the attitude expressed in this editorial, have actually prospected in the deposits at the Lindenmeier site.

The season for archaeological field work is here. It is well to consider the possible results of one's studies and to regulate one's conduct in accordance with the best interests of American archaeology, so that there may be no personal or professional regrets.

CEG.

NON-DESTRUCTIVE RESEARCH . . . There are students who wish to acquire experience in field research but who have only an occasional week end, or similarly limited time period to devote to such work. For such students, service with an organized field party under competent direction would be entirely out of the question. There are, however, important and interesting varieties of research legitimately open to these students, involving work in both field and laboratory.

The success of surface survey in many districts is largely dependent upon the intermittent services of local amateur students. Any man with a heart for exploration would enjoy survey work, and it is of primary importance to all archaeologists. The work involves: the discovery and accurate recording of new sites, and of detailed features at a given site; the collecting and careful cataloguing of culture-indicative materials occurring on the surface at sites; and the recording of data from local collections of materials found at such sites. To this branch of activity may be added the endless opportunity for the study of materials and other data so collected.

These studies may center about such problems as: the mapping of sites and surface features at sites in the studied area; the geographical distribution of traits or trait complexes; the analysis of a certain class of materials, such as pottery; and laboratory experimentation in primitive sources and methods, possibly involving the reconstruction of methods and, in demonstration thereof, the reproduction of artifacts.

Many non-specialist students are now engaged in important research projects of this type, well within the scope of their training and experience. To the thorough enjoyment which they derive from this interesting work may be added the satisfaction of contributing thereby to the fund of knowledge available to archaeologists. How greatly this is to be preferred to the painful knowledge, or even possibility, that one's efforts have resulted in the destruction of information the value of which no one can ever definitely estimate.

WCM.

AN ARCHAEOLOGICAL RECONNAISSANCE OF THE MIDDLE AND LOWER YUKON VALLEY, ALASKA.[2]

FREDERICA DE LAGUNA[3]

DURING the summer of 1935, the University of Pennsylvania Museum sponsored an archaeological and geological survey of the middle and lower Yukon valley, Alaska. The work was financed through the generosity of the National Research Council and the American Philosophical Society. The party consisted of: Dr. A. J. Eardley, Department of Geology, University of Michigan; Mr. Kenneth Gorton, a student of geology at the same institution; Mr. Norman Reynolds, a student of anthropology at the University of Washington; and the writer.

The principal object of the expedition was to investigate the possibilities of finding ancient human remains in the Yukon valley. The discoveries of ancient artifacts (belonging to the so-called Folsom culture) in association with bones of extinct animals, show that human beings lived on the southern High Plains east of the Rockies at the end of the Pleistocene or during the early post-Pleistocene. The most important problems today in American archaeology are the definition of this culture (or cultures), the mapping of its extent in time and place, and the tracing of the route by which its carriers, presumably the first Americans, entered this continent and penetrated to the Southwest. The work of Dr. Frank H. H. Roberts, Jr., of the Smithsonian Institution,[4] and of Dr. Edgar B. Howard[5] and Dr. J. Alden Mason,[6] of the University of Pennsylvania Museum, is contributing much towards the solution of the first two problems mentioned, but the Folsom culture still remains, as it were, hanging in a void. We know that it is considerably older than the oldest Basket-Maker remains, but we know nothing of its possible relationships with other archaeological cultures, nor of its origin or historical antecedents. Geological evidence shows that during

[2] A preliminary report of this work is also appearing in a current number of the *Miscellanaea* of the American Philosophical Society.

[3] University Museum, Philadelphia, Pennsylvania.

[4] F. H. H. Roberts, Jr., A Folsom Complex, Smithsonian Misc. Collections, Vol. 94, No. 4, June 20, 1935.

[5] E. B. Howard, Evidence of Early Man in America, University Museum Journal, Vol. XXIV, 2–3, Univ. of Pa., 1935.

[6] Dr. Mason is at present investigating the possible spread of Folsom types in northern Mexico.

the latter half of the Wisconsin Period an ice-free route was open from Central Asia, across Bering Strait (or via St. Lawrence Island) to Alaska, up the Yukon valley, across into the Mackenzie watershed, and down the eastern edge of the Rockies, along the retreating border of the Keewatin ice sheet. So far no archaeological evidence has been produced to show that such a route was actually taken by early man. In fact we have little archaeological material of any sort from the regions involved. The archaeology of northeastern Siberia is practically unknown, as is that of the northern states and Canada along the eastern slopes of the Rockies. From St. Lawrence Island and the northwestern part of Alaska we have many valuable finds,[7] but this material sheds light only on the development of Eskimo culture, and tells nothing about a possible earlier culture. From the Yukon valley there are the specimens collected by Dr. Aleš Hrdlička[8] in the course of two rapid surveys in 1926 and 1929, and a few specimens at the University of Alaska at Fairbanks, but these belong only to the late prehistoric Indian and Eskimo cultures in that area. Human artifacts associated with mammoth and other Pleistocene animal bones have been reported from the frozen mucks above the auriferous gravels in the placer mines of the Fairbanks district (middle Tanana valley). As yet, however, no specimens of proved provenience have been found which are the indubitable work of human hands, in the opinion of Dr. N. C. Nelson, who has examined the material sent to the American Museum of Natural History. It is said that some of the specimens found in the placer workings have never been made public, so that final judgment on this matter will have to be reserved. On the other hand, the manner in which such finds are made leaves much to be desired from a scientific point of view, so that unless specimens are found still frozen *in situ* we cannot over-

[7] Therkel Mathiassen, Archaeological Collections from the Western Eskimos, Report of the Fifth Thule Expedition, Vol. 10, No. 1, Copenhagen, 1930.

J. Alden Mason, Excavations of Eskimo Thule Culture Sites at Point Barrow, Alaska, Proc. Twenty-third International Congress of Americanists, New York, 1930.

Diamond Jenness, Archaeological Investigation in Bering Strait, Annual Report, National Museum of Canada for 1926, Ottawa, 1928.

Henry B. Collins, Jr., Prehistoric Eskimo Culture on St. Lawrence Island, The Geographical Review, Vol. XXII, No. 1, Jan. 1932; Archeology of the Bering Sea Region, Smithsonian Report for 1933, Washington, 1935.

[8] Aleš Hrdlička, Anthropological Investigations in Alaska, 46th. Annual Report of the Bureau of American Ethnology, Washington, 1930; Anthropological Work on the Kuskokwin River, Alaska, Exploration and Field-Work of the Smithsonian Institution in 1930.

look the possibility that they may be derived from Indian sites on the surface. On the brink of the hill on which the University of Alaska is situated there is a site which has yielded a number of chipped-stone implements: weapon blades with tang but without barbs, small end-scrapers, small flakes struck from narrow, pointed cores. Dr. Nelson has noted the remarkable similarities of some of these specimens to epi-Paleolithic or Neolithic finds which he made in Mongolia. But even though the relatively great antiquity of the Alaska specimens could be proved, a point to which I shall return presently, they seem to shed no light on the origin of the Southwestern Folsom types. Another Alaskan find which we felt should be investigated further was that of the crude-chipped stone scrapers, collected by Dr. Hrdlička at Bonasila, on the lower Yukon. The crudeness of the technique characterizing these specimens raised the possibility that these specimens might be quite old.[9]

The second problem which we wished to attack in our survey of the Yukon valley was that of the more recent archaeology, particularly the relationship of the prehistoric Indians to the Eskimo. There is some evidence that the Eskimo formerly lived farther up the Yukon than they do at present. A small stone lamp with a human figure in the bowl, found on the Khotol River near Kaltag and now at the University of Alaska,[10] suggests that there existed a stage of culture closely related to the Third Period of the Kachemak Bay Eskimo culture of southwestern Alaska. Our examination of the site from which this lamp was supposed to have come revealed only the lower Yukon Indian culture, as described below, with nothing peculiarly suggestive of a link with southwestern Alaska.

We originally chose for our survey the section of the Yukon valley between the mouth of the Koyukuk River and Holy Cross: first, because the Yukon was the only ice-free corridor leading into the interior of Alaska; second, because any early migrations must have traversed this portion whether they entered the valley at its mouth or via one of several low passes from Norton Sound; and third, because Dr. Hrdlička's investigations had shown this region to contain a number of Indian sites. When in the field, we found it advisable to extend our survey to include the entire stretch from the mouth of the Tanana River to Holy Cross, including ninety miles on the Koyukuk River, the Kaiyuh Slough-Khotol River system, and the Shageluk Slough, which

[9] Article by H. W. Krieger in Hrdlička's Report, 1930.

[10] Frederica de Laguna, The Archaeology of Cook Inlet, Alaska, 1934, Plate 71, pp. 177–179 (cf. next to last chapter).

connects the Yukon with the Innoko River, its southernmost tributary of any size. This work involved the mapping for the first time of the Kaiyuh Slough and Khotol River. We traveled in two 15-foot skiffs which we built at Nenana, and in them covered a total distance of some 1600 miles. Our most intensive work, however, was done on the stretch of the river originally chosen.

Unfortunately, the results of our reconnaissance have nothing positive to add to the problem of early man in Alaska. The geological report, which is being prepared by Dr. Eardley, will present valuable information about the Pleistocene and Recent history of the Yukon valley, but there seems to be slight likelihood of finding anything archaeologically old in this region. The river carved its valley long before there was any possibility of human occupants. From late Tertiary times to the present day there has been a complicated cycle of deposition and erosion of the gravels, silts, mucks, and peats which fill the old valley bottom, and through which the Yukon is still cutting. The frozen gravel and silt series were once about 1500 feet high. Erosion removed the upper 500 to 800 feet of these silts, leaving a thin veneer on top of some of the bedrock hills. The shifting river channels across the ten- to fifty-mile wide valley left accumulations of frozen muck and peat on top of the silts. It is in these mucks that the mammoth and other Pleistocene animal bones have been found, and in which the alleged human artifacts of the placer mines have been reported. These mucks may be from 20,000 to 50,000 years old, and if this estimate of their age is correct, we should hardly expect them to carry traces of man. Later erosion cut away the silts and mucks, leaving 200- to 300-foot terraces along the edges of the valley, and fresh deposits of silt and peat were made in the valley bottom, which are now being washed away. Any search for traces of ancient man in this region is hampered by the fact that the land surface on which he may have lived has probably been destroyed by erosion. Even in the places where it may be preserved, it is impossible to guess which would have been the most likely camping places, since there have been such striking changes in topography. Probably many sites were close to the water, and have been washed away long ago. This does not mean, of course, that ancient human remains may not be found by chance, washed out by the river and redeposited in old bars, just as the jetsam of logs and Pleistocene animal bones have been deposited, only to be exposed by the caving of the banks. But it would not be profitable for an expedition to search for such remains.

Though this phase of our archaeological reconnaissance led to negative conclusions only, we were fortunate in our search for prehistoric Indian sites. A number were found which would repay intensive excavation. These are in the stretch between Nulato and Holy Cross, in territory now occupied by the southwesternmost group of Yukon Athabaskans, the "Inkalit," as they are called by their Eskimo neighbors below Holy Cross. These sites seem to be Indian, but the range of specimens from various sites all the way down the river from the mouth of the Tanana to an Eskimo site some fourteen miles below Holy Cross show that in former times, as today, there existed no sharp frontier between the Yukon Indian and the Yukon Eskimo cultures. While our collections are not large enough to define the prehistoric Indian culture, they suggest that it is intermediate in type and age between the Third Period of the Kachemak Bay culture of southwestern Alaska, and the modern Eskimo culture of the Bering Strait region. The types found include the following: semi-subterranean house, with bark and sod roof, central fire, and long entrance tunnel; burial (in special cases only?) under the floor of the house; stone adzes of the type that I have called "splitting" adze, both single- and double-ended, with variations suggesting a braining weapon rather than a chopping tool; "planing" adze blade; stone hammer, club, and saw; whetstone; stone vessels used as lamps and as paint mortars; slate ulu blades with curved and with straight edges, and with plain bone or antler handles; ulu-shaped scraper (it is scrapers of this type, made of naturally fractured boulders from the beach, which form the bulk of the crude stone specimens from Bonasila); slate arrow or lance points with concave base forming two spurs or barbs; leaf-shaped weapon blade of slate with tang but no barbs; chipped end-scraper blade with bent wooden handle; chipped arrow or lance point with tang but no barbs (like the specimens from the University of Alaska site); slender core and flake (like those from the University of Alaska site); stone drill point; mouth-piece for bow drill made of caribou astragalus, or of wood (?) with stone inlay; net float of wood; net sinker of unworked beach pebble; bone or antler netting shuttle; notched stones; red paint (made of baked silt ?); barbed and unbarbed bone and antler arrowheads; barbed point for multipronged spear or dart; blunt head for bird arrow; barb for fish hook or for side-prong of fish spear; thin harpoon head with medial spur, open socket closed by lashing in a groove, without barbs; antler wedges for splitting wood and stripping off bark; bone awl; bone boot creaser; scraper of moose or caribou leg bone with longitudinal or transverse

edge; scraper of moose or caribou scapula with longitudinal edge; bird bone tube; bone handle for man's knife, or for bags; bone dagger; antler comb; bone and antler pendants and ornamental plate; carving of a mouse; wooden trigger for automatic bow; wooden dipper; wooden shovel with paddle-shaped blade; twined-bark matting; birch bark baskets; birch bark canoe; pottery cooking vessels and lamps.

Some of these types were represented by specimens from prehistoric sites, some from sites which showed white contact in the form of glass beads and steel cutting tools, others from sites which we could not date. As far as we can tell at present, the stage of culture which these specimens illustrate extended well into modern times, possibly until the middle or latter part of the last century. The transition to the modern material culture seems to have been abrupt. However, intensive excavation will have to be undertaken before the chronological relationships of these various types can be determined, or before the prehistoric boundary between the Eskimo and the Indians can be traced. Our reconnaissance enabled us, however, to establish the fact that the crudely chipped Bonsila specimens belong to this Indian culture, and the probabilities are that the site on the University of Alaska campus belongs to the same stage.

The most important single discovery of the expedition was that of pottery at the mouth of the Tanana; it had previously been reported only as far up the Yukon as Anvik. This discovery extends the known area for pottery some 500 miles farther up the river. We also found pottery ninety miles up the Koyukuk, and the natives report it from the Yukon forty miles above the mouth of the Tanana, and from the headwaters of the Nowitna and the Innoko. It is quite possible that all the Athabaskans below the true Kutchin made pottery. The ware is much finer than the Eskimo pottery from the region about Bering Strait. It is made of blue clay, mixed with hell-diver feathers (and hair ?) and grease, dried beside an open fire, so that the color varies from gray or black through tan to orange. The vessels range in size from large pots holding several gallons to the small saucer-shaped lamps. The pottery from the Koyukuk and from the Yukon and its tributaries below the mouth of the Koyukuk was decorated with simple patterns of incised lines and dots near the rim. Some of the larger vessels were decorated on the inside just below the rim. The lamps were decorated on the inside about the rim, while some of the larger specimens had a pattern which covered the entire interior.

A number of the bone implements are decorated with typical

Eskimo patterns of spurred lines or rows of dots. Two of the scapula scrapers have incised pictures of birds and a human figure. These, together with the bone carving of a mouse, are the first examples of prehistoric realistic art from this region.

Besides our archaeological and geological work, we made a small collection of ethnological objects, the most interesting of which are a number of wooden masks from Hologochaket, an Indian village on the Innoko, not far from Anvik. We also recorded some myths and folktales and obtained some scattered ethnological information.

ANOTHER MAYAN HIEROGLYPH FOR "DAY"

HERMANN BEYER[11]

Charles P. Bowditch reproduces about seven different signs as hieroglyphs for *Kin*, "day," in his fundamental work on the Maya calendar.[12] They are: (1) the sun-disk, (2) the head of the sun-god, (3) the head of a sun-bird, (4) the dog's head, (5) the conch, (6) the inverted *Ahau* and (7) the composite glyph day-sky, sun-disc and *Caban*. There can be identified still a few more hieroglyphs as representing the same idea.[13]

In this paper we shall treat of a new sign, generally composed of a quincunx (a variant of the character for "greenstone") and a skull (Figure 1, a, b and f), for which the value "day" can be proved.

Some time ago Morley mentioned this sign, which he thought stood for the numerical value 10.[14] This explanation, however, must be dropped, since our better knowledge of the Supplementary Series allows us to say today that the glyph could not have arithmetic significance. On the other hand, some meaning must be assigned to it, and the simplest explanation is that it represents the concept "day." According to this hypothesis, "5 days" and "7 days" will, then, be indicated by Figure 1, a–b, respectively. This would be the corresponding moon-age and agrees with computation.

Generally, no hieroglyph for "day" accompanies the numeral before Glyph D of the Supplementary Series, it being understood that it refers to days. Sometimes, however, be it caused by a caprice of the sculptor or suggested by special space conditions, the hieroglpyh for "day" is added, as exemplified by Figure 1, c–e. Figure 1, c, represents "27 days." In it the "20" is indicated by the usual moon-sign of this series, while the additional "7" has the conch-variant under it as sign for "day." In Figure 1, d–e, the dog's head represents the idea "day." In Figure 1, e, it has the "Sun Beard" as superfix and a flame subfix.

Although these and a few other similar cases are quite sufficient to sustain our hypothesis, the best proof is supplied by Figure 1, f, which in consideration of its connection in the text can only mean "7 days." It occurs on a newly-discovered stela from Palenque, and came to my notice first through an article in *Revista de Revistas*.[15]

---

[11] Dept. of Middle American Research, Tulane University, New Orleans, Louisiana.

[12] Charles P. Bowditch, The Numeration, Calendar Systems and Astronomical Knowledge of the Mayas. Cambridge, Mass., 1910, Pl. XIV.

[13] Thus, for instance, the monkey head. El Mexico Antiguo, Vol. II, pp. 286–287.

[14] Sylvanus G. Morley, The Inscriptions at Copan. Washington 1920, p. 168.

[15] Cesar Lizardi Ramos, En Torno la última Inscripción Palencana. Revista de

Having established the value "day" for the new sign by the three cases illustrated in Figure 1, a, b and f, we can go a step further and also ascribe the same significance to the sign when associated with a hieroglyph of still unknown meaning. In the inscriptions of Yaxchilan there appear, generally, one or two hieroglyphs inserted between Glyphs F and E D of the Supplementary Series. They consist of a curious long-

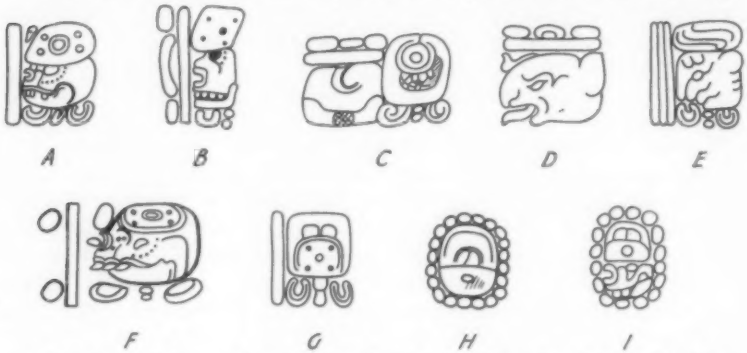

FIG. 1.—*A*. Palenque, Temple of the Cross; *B*. Yaxchilan, Lintel 21; *C*. Yaxchilan, Altar Structure 44; *D*. Quirigua, Stela E; *E*. Yaxchilan, Lintel 29; *F*. Palenque, New Stela; *G*. Yaxchilan, Lintel 29; *H*. Quirigua, Stela F; *I*. Yaxchilan, Lintel 14.

limbed animal with the head or forehead of God K, and having the day-conch for belly, preceded by a numeral. In some instances the numeral directly adjoins the fantastic animals, but in two cases (lintels 21 and 23) it is connected with the skull-quincunx sign. As these heads are practically identical with our Figure 1, a, b and f, they are not reproduced here.

In one case (lintel 29), already mentioned by Morley, a simpler variant (Figure 1, g) is given. It has only the quincunx, and this is clearly considered as the disc of a greenstone-variant. We can infer from this specimen that the greenstone-quincunx is the more important part of the sign, the skull being adventitious.

We have a similar case in the *Uinal* hieroglyph *Mol*, which appears in the simpler form (Figure 1, h) as well as in the composite form with skull (Figure 1, i); but in this case the common form is the simple one, while the skull compound is rare. The principal character in hieroglyph *Mol* is the greenstone-disc in its plain form: that is, without the dots in the four directions.

Revistas, Mexico City, 26-year, no. 1345 (Febr. 23, 1936). A larger reproduction will be published in one of the next numbers of Maya Research.

DATING THE ERUPTION OF SUNSET CRATER, ARIZONA

JOHN C. MCGREGOR[16]

ALMOST all archaeological work in the Southwest in the past several years has been an attempt to establish a series of events in their proper time and space context. This implies as the ultimate objective the building of a spacial series of chronologies, each one of which will give as complete an historical picture as is possible to obtain from archaeological data. The particular emphasis which has been, and is being, placed on chronology has directed attention to the methods by which this end is attained. The method has been set forth in 1931 by Leslie Spier in an article in "Methods in Social Science."[17]

The list which Spier suggested is composed of the following methods: geology and paleontology, distribution, typology, stratigraphy, seriation, annual deposits, and documents. The writer agrees essentially with each one of these, as defined, with the exception of seriation, which it is felt might more profitably be re-defined as the correlation of series, and designating the relating of two or more chronologies built by one or more of the above methods. All serious scientific work attempts to check one group of data against another, as far as possible. Archaeology combines as many of the methods mentioned as are available by the process of seriation before an evaluation is attempted. If the preponderance of the data then points to one conclusion. after all questionable or doubtful indications are eliminated, this conclusion may be accepted as highly probable or a fact.

This paper is a formal application of the seriation process to the determination of the date of the eruption of Sunset Crater, a prehistoric cinder cone near Flagstaff, Arizona, the eruptions of which created situations of considerable archaeological importance.[18]

The primary methods of value in this undertaking are the following: *geological*, because of the phenomenon of the eruption itself, and the attendant scattering of ashes, or cinders, over a wide area; *typological*, of great importance in the building of a series of pottery designs, and the classification of other artifacts and remains; *stratigraphical*, in the recognition of certain sites lying beneath the cinders from the eruption; and most important of all *dendrochronological*, or tree-ring dating, as the means by which at least approximate dates may be assigned.

For the past six years the Museum of Northern Arizona has been

[16] Flagstaff, Arizona. [17] Spier, 1931. [18] Colton, 1932.

actively engaged in the excavation of sites which lay both below and above the cinders from Sunset Crater eruption. The area is a relatively small one, about fifteen by twenty miles, bounded on the west by the San Francisco Peaks and on the east by the Little Colorado River.[19] Although the culture is basically uniform over this area, slight (almost microscopic) variations are noticeable between those ruins lying immediately near the river, and those of the cinder area of Bonito Terrace almost in the shadow of Sunset Crater, while another important group on the Baker Ranch northeast of the San Francisco Peaks shows still other slight variations. These three groups of sites in their tiny geographical areas will be spoken of as the River group, the Sunset or Bonito Terrace group, and the Baker group. All of the sites, with the exception of the River group, are well within the Yellow Pine area, and were for that reason extensively dug.

With the discovery in the cinder area of sites which were still covered by fallen cinders, and the recognition in the summer of 1930 that these sites were thus definitely pre-eruptive, efforts of field parties were from that time on directed towards the recovery of information which would date the eruption. The building of a typological pottery series, through a casual application of seriation, quickly led to the relegation of sites beyond the cinder fall area to both pre- and post-eruptive classes, so that a relative chronology based upon this one event was established. The local archaeological importance of the eruption soon became apparent, and it has awaited only the accumulation of sufficient data to reduce it to a true date in the absolute chronology of time.

At present the excavation of more than 112 sites and the securing of dates from sixteen of these have made feasible an attempt at actual dating. During the past summer six more sites beneath the cinders were excavated which gave every evidence of belonging to a period just preceding the eruption. As these were all contemporaneous and from the heart of the area under discussion, they will be included although no dates were secured from them.

Table I presents the list of dates secured from those sites which bear most directly on the question of the eruption date, and as this is our most reliable single source of information, it is presented first. In each instance the site number assigned by the Museum of Northern Arizona Archaeological Survey precedes the list. This is followed by a series of dates, in many cases expressed as last ring dates present on the

[19] Colton, 1918, 1932.

TABLE I. LIST OF DATES PERTAINING TO THE ERUPTION

Site

N.A. 2800—680, 711, 749, 792. (All last ring dates, by A. E. D.) Estimated building date *750 ±40*

N.A. 2551—685+X. (by A.E.D.) Building *750 ±40*

N.A. 2798—710, 737, 742, 747, 748, 752, 758(2), 798, 800, 828, 927, (Last ring dates by A.E.D.) All Planks. Building *800 ±40* and *950 ±20*

N.A. 1531—708+X, 833(D), 846 (D). Building *850*

N.A. 1925B—840 ±7(D), 855 (D). Building *860*

N.A. 1920B—860(D). (Weak date), estimated building *875*.

N.A. 1680—880 ±20(D), 899 ±10, 909 ±20, 903 ±10. Building *910*.

N.A. 1625B—924. Building *950*?

N.A. 1625C—777+X, 784+X, 870+X, 900 ±4, 947 ±10. Building *950*.

N.A. 2004B—932 ±10, 943 ±5. Building *950*.

N.A. 408—849, 851, 868. (All by A.E.D., probably all central pieces). Building suggested by A.E.D. *976*.

N.A. 2001—825+X(D), 911+X, 965, 967 ±3. Building *970*.

N.A. 862—904+X, 914+X, 1028, 1032+X, 1055(2), 1058(2), 1059(2), 1061, 1063(2). Building *1060*.

N.A. 1238—1054 ±10(D), 1060 ±3, 1066(2)(D), 1070 ±6. Building *1070*.

N.A. 2002A—914+X(D), 937+X, 939+X, 941+X, 943+X, 947 ±10(2), 980 ±12, 981 ±1(D), 1003+X, 1052+X, 1068+X, 1077+X, 1112+X(D), 1115+X, 1116(D). Building dates (950, 1050,) and *1120*.

N.A. 739A—1092. Building *1100*?

N.A. 739B—1083 (Dating weight 8 in scale of 10). Building *1100*?

N.A. 538—1156+X, 1182, 1183(4), 1184(2), 1192(2)(D), 1260(D). Building *1185*.

A long series of dates from this period on.

specimen, but in others as an absolute date or with an estimate of the number of rings missing, as indicated by a plus and minus followed by a figure. Following the suggestion of W. S. Stallings, Jr., of the Laboratory of Anthropology, where the true outside is obviously absent and there is no indication of the number of rings lost, this uncertain quantity is indicated by an X. A figure in parenthesis indicates the number of separate specimens which shared the same end date. Although all of these dates have been personally checked by Dr. Douglass, those which were originally dated solely by him are indicated by a (D) following the date. In every case where questionable dates have been secured they have been omitted.

At the end of each series of dates is the suggested building date, or the period of most general activity at the site. In one case three dates

are given, for a building date followed by two periods of repair are suggested. As no trash accumulation was found at any site, with the exception of N.A. 1600, and as these sites are in every case, except that of N.A. 1600, single-room pithouses, it has been assumed that the pottery sherds found in the houses and the vessels with burials or in the rooms were either of the dates indicated by beams from the site or slightly later.

In reviewing the list of estimated building dates, it will be noticed that they run in an almost unbroken series from 750 A.D. to 1100 A.D., thus presenting a full chronology of over 350 years.

As the first attempt at seriation, the typological pottery series may be introduced. It has been generally felt for some time that pottery designs were more widespread and reflected more minute temporal changes than any other physical features of pottery. For that reason, this series was based solely on designs.

The sherds under consideration readily grouped themselves into five great classes. (1) Those which showed no obvious deliberate decorative design or decorative elements. These were all classed as plain, although they might actually be the base or other undecorated portion of an otherwise decorated vessel. (2) The vessels and sherds decorated with a black design on a white background. (3) Those sherds and vessels which were decorated with neck coils or bands and corrugations. (4) Those carrying black designs on a red background, which were recognized as having slightly different designs from the associated black-on-white but were too few in number to be of much value in such a study. (5) The polychromes, or those sherds which showed three or more colors, again too few in number to be of any value in a design typology. Thus, the black-on-white and the coiled and corrugated styles were of the greatest real value.

TYPOLOGICAL SERIES OF POTTERY DESIGNS

Coiled neck and corrugated series (Coil)

Coil I — Typically flattened coils with rounded edges, the commonly recognized Pueblo I type, often found on Kana-a type vessels. Plate I, Figure 1, Coil I.

Coil II — Flattened coils with tool-squared edges, forming a cornered or squared section. Plate I, Figure 1, Coil II.

Coil III — Narrow, high, rounded coils, fine incised marks separating coils. Plate I, Figure 1, Coil III.

Coil IV — Narrow coils with a flattened surface, deeply tool-incised along the coils and occasionally across. (Often found on Coconino Gray type of pottery.) Plate I, Figure 1, Coil IV.

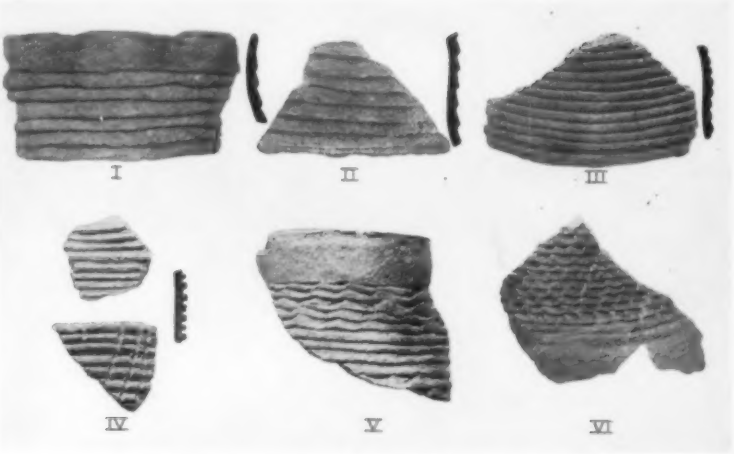

FIG. 1.—Sherds illustrating types of coil pottery.

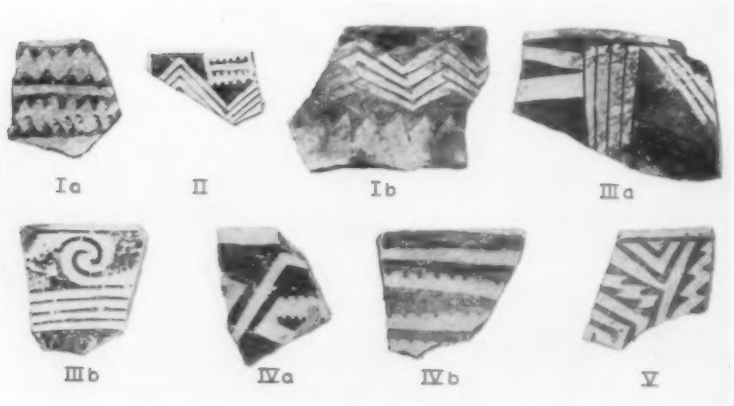

FIG. 2.—Sherds illustrating styles of decoration in black-on-white pottery.

Corrugated or indented coiled olla, found broken on the old ground surface beneath the cinders. The enlarged section clearly shows the style of indenting, and fine black cinders still adhering to the deepest crevices.

Coil V Rounded and generally incised coils with wavy and finger-indented types of corrugations, generally in bands. (Variants—large triangular corrugations partially smoothed, etc.) Plate I, Figure 1, Coil V.

Coil VI Fine, regular, deeply and sharply indented corrugations often over entire outer surface of pot. (Such as found on Tusayan Corrugated type.) Plate I, Figure, 1, Coil VI.

Black-on-white series (B/W)

B/W I Very fine lines overlapping at junctures, formed in parallel bordering groups, high triangles and massed black areas, pendant dots occasionally on fine lines or at tips of triangles, design areas often in quadrants separated by vertical parallel lines. (Kana-a Black-on-white type.) Plate I, Figure 2, B/W Ia, Ib.

B/W II Rectangles of massed black more common, lower longer black triangles, medium fine lines (between I and III), dots occasionally pendant on triangles. Plate I, Figure 2, B/W II.

B/W III Narrow lines combined with wide lines, squiggle and straight hatchures, diamond or checkerboard effect, lower or very low right triangles, elementary interlocking scrolls, dots or angular serrations on lines or triangles. Plate I, Figure 2, B/W IIIa, IIIb.

B/W IV Wide lines (four to eight millimeters), with occasionally attached dots, triangles with serrated edges, large areas of mass black, some large scrolls. Plate I, Figure 2, B/W IVa, IVb.

B/W V Broad zig-zag lines, lines with small low triangles opposed to the zig-zag lines or each other. Plate I, Figure 2, B/W V.

Black-on-reds (B/R)

Too few specimens in the collection to draw any conclusions of the changes in design elements.

Polychromes (Poly.)

Poly. I Design elements show considerable variation, the most important consideration here being the change from two-color black-on-red to three-color black and red on orange. (Citadel Polychrome type.)

Plain

All sherds and pots showing no intentional design on the fragment.

A slight additional identification of the first four black-on-white pottery styles of decoration might be advisable. One, Two, and Three would probably be classed by the Museum of Northern Arizona as of the Kana-a style of design, while Four would be relegated to the Deadmans style.[20] However, in the microscopic examination necessary to

[20] Hargrave, 1932.

establish the short time evolution of these styles it was necessary to separate them into smaller divisions than are generally useful. From Table II it will be noted that B/W style II was found only in those sites from the Baker Ranch, thus suggesting that it was here localized in the immediate vicinity of the San Francisco Mountains, and associated with sites which would normally be classed as a Pueblo I stage of culture. At the same time it appears to be very limited temporally. Also in Plate I it will be noted that B/W Ia is slightly different in general character and execution than Ib, the first being from the Baker Ranch and the second from the River site would illustrate the minute geographical distinctions mentioned before.

In Table II a slight re-arrangement of order has been effected by the distribution of pottery styles. This is particularly noteworthy in N.A. 2004B, where the two dates secured from this site suggest a building period of about 950 A.D. However, an examination of dates secured from an obviously late site such as N.A. 2002A indicates that some early dates may be expected even in such a late site. The one late date secured from N.A. 2798 in the same manner may not be as truly significant as first appearances would indicate.

Before any discussion of the validity of these dates is undertaken it would perhaps be advisable to consult one more source of information that will assist in the dating of the eruption. This is the obvious stratigraphic evidence of a pre-eruptive site, in that it is covered by fall cinders. To determine whether the site is covered by actual fall cinders, and not by wind-blown cinders which have covered it long after the eruption, it has been necessary to observe closely the nature of the cinders themselves. If they are arranged in strata easily recognizable, of alternately coarse and fine cinders, and if these are all freshly angular and covered by a layer of more rounded fine cinders, it is assumed that the lower strata, or angular stratum, was deposited by falling into the site and not by later wind action.

On this basis sites N.A. 1925B, 3056, 1600, 1922A, 1922B, 3029A, and 3028 may all be classed as pre-eruptive. Ceramically all of these sites fall into the upper half of Table II, and are in agreement temporally with other sites outside the cinder area which have been dated.

At a conference held at Gila Pueblo in May 1931, it was agreed by attending archaeologists that a chronology should be based on: (1) tree-ring dating, (2) stratigraphy, (3) cross dating, and (4) intensive analysis. However, in the evaluation of information supplied by the tree-ring method, it is necessary to keep constantly in mind that certain

TABLE II. PRESENTED AS PERCENTAGES OF THE TOTAL SHERDS COLLECTED FROM THE SITE

Site	B/W I	B/W II	B/W III	B/W IV	B/W V	Coil I	Coil II	Coil III	Coil IV	Coil V	Coil VI	B/R	Poly. I	Plain	Total	Approx. Date
N.A.2800	9.0	7.0										2.0		81.0	213	750 ± 40
2551	0.9													99.0	158	750 ± 40
2798		5.0	6.0			0.6				0.3		2.0		85.0	322	800 ± 40
1531	1.0	2.0										2.0		95.0	179	850
1925B	1.3	2.0	11.3	0.6								2.0		82.8	150	860
1920B	2.0		4.0	1.0		0.5				0.3		0.3		91.0	345	875
3056			2.0	0.7		0.9	0.2		0.1	0.1		0.5		95.0	1934	
1600	0.7		9.2	6.9		5.5	2.8	0.9	0.8	1.4		2.7		69.0	11685	
1922A	1.9		2.9	1.5		0.06	0.03			0.02		0.02		95.0	1164	
1922B	2.6		1.7	1.7		0.8						0.8		92.2	115	
3029A	0.2		3.0	3.1		3.2	0.03	0.02	0.03	0.02		0.01		87.3	1572	
3028	0.3		1.2	2.8					0.3	0.6				95.2	326	
1680				28.0						5.0	2.7	16.0		49.0	218	910
1625B				4.5						0.7	18.9	2.3		73.2	132	950?
1625C				4.5						0.7	18.9	2.3		73.2	132	950
408				6.5						2.7	4.3	43.0		47.0	185	976
2001			8.0	9.6							1.5	32.2		48.2	198	970
1570A			9.0	35.0					0.5	0.5		5.5		49.5	200	1050?
862			9.1	20.9						9.5		23.6		43.3	217	1060
1238			3.6	6.8						2.0		9.2		79.3	253	1070
2002A				36.1							7.5	13.5	0.5	41.3	198	1120
2004B			0.4	9.4	0.7						22.9	4.5	2.2	60.0	267	950?
739A					1.3						2.0	0.03		96.0	1367	1100
739B					1.3						2.0	0.03		96.0	1367	1100
538																1185

complications may be encountered in the correlation of dates with general culture. One of the most common of these encountered in this area is the possible re-use of beams from earlier structures. The knowledge that old beams are commonly subjected to new use by modern pueblo builders, combined with the exceptionally long series of dates noted in some of the single room pithouses in this area, certainly indicates that such was the case.[21] N.A. 2002A is a good example. For that reason, in every case except one, the site has been listed in Table I by its latest series of dates.

In all wooden structures, such as the pithouses of this region, a great many beams, planks, and splints were embodied in its construction. Because an exceptional and peculiar combination of incidents is required to preserve this wood as charcoal, it is entirely conceivable that in the case of only one or two dates from a site these may be earlier than the final period of occupation. Such is probably the case, as has been pointed out previously of site N.A. 2004B. Such a criticism might also be directed to 1920B and 1925B, but the process of seriation already undertaken indicates that they are comparable in time to N.A. 1531, and that all three sites show dates which are remarkably uniform.

As has been previously explained, the very basis of any such undertaking as ours is the reliance upon quantities of data which are then correlated by the seriation process. One more apparent discrepancy of dates as indicated in Table I must now be considered upon this basis. Site N.A. 2798 yielded, in all, twelve different dated beams. The final ring present on each of these beams gives dates which form a series from 710 to 828 A.D., but one additional date of 927, or one hundred years later than the latest of the series, stands out from the rest. On the basis of quantity alone this date might be disregarded, but when it is compared with other dates of the series, and when the ceramic typology, with the exception of one No. IV coil which was found in the site, is considered, it becomes at once apparently disharmonic.

A careful perusal of the field notes taken at the time of excavation of this site indicates that in the region within the structure from which this beam was secured at least two rodent nests were encountered. Further, an intrusive burial was secured from a structure of similar period in the immediate vicinity, and contained pottery of a type which could easily be associated with the date 927 A.D. Thus it is entirely conceivable that this charred beam was included in the site after it was

[21] Haury, 1931, pp. 12–13.

abandoned, and as any questionable data are to be ruled from this discussion we must logically eliminate this date.

So far we have combined by seriation four types of basic chronology-building data: dates, pottery typology, geology, and a simple sort of stratigraphy. After slight readjustments have been made, a definite chronology is observed in Table II, indicating that the eruption took place in the latter half of the ninth century A.D.

To this let us add a further typological series: that of house types, considering the sites from an architectural standpoint in the order in which they are listed in Table II, particularly those which now appear to have been occupied near the time of the eruption.

N.A. 2800—a shallow earth lodge, largely of wooden construction, with double corner-post support, and no ventilator.[22]

N.A. 2551—a shallow earth lodge, largely of wooden construction, with double post support, irregular in shape with occasional large rocks included in the walls, large "storage" holes in the floor, and no ventilator.

N.A. 2798—a deep rectangular wooden pithouse with ventilator, identical in general features to typical Pueblo II houses.

N.A. 1531—a moderately deep pithouse almost identical in every major feature to N.A. 2798.

N.A. 1925B—a characteristic deep Pueblo II type wooden pithouse.[23]

N.A. 1920B—a very deep wooden pithouse, typical Pueblo II, but with several large circular "storage" holes in the floor.

N.A. 3056—a deep and remarkably preserved rectangular wooden pithouse, typically Pueblo II with ventilator.

N.A. 1600—a series of four shallow rectangular masonry pithouses, contiguous (these were located, however, outside the small area of the other sites).

N.A. 1922A—a typical Pueblo II wooden pithouse with ventilator.

N.A. 1922B—close to, and identical to, N.A. 1922A.

N.A. 3029A—a small deep rectangular stone pithouse of basalt walls and having an eastward extension enlarged to a small "annex," but no obvious ventilator.

N.A. 3028—a site similar to N.A. 3029A except that the "annex" was absent and in its place was an inclined entrance-way or ventilator.

N.A. 408—a rectangular and typical Pueblo II wooden pithouse.

[22] Spicer, 1934.

[23] Hargrave, 1933.

N.A. 1680—typical Pueblo II rectangular wooden pithouse with ventilator.

N.A. 1625C (also B and D)—a typical deep Pueblo II wooden pithouse with associated storage room or granary.

N.A. 2001—typical wooden Pueblo II pithouse.

N.A. 1570A—typical deep Pueblo II wooden pithouse.

From this it would appear that a typological house series might be reconstructed as follows: (1) a shallow wooden pithouse with no ventilator or horizontal entranceway, but with double support poles; (2) the development of the deep rectangular wooden pithouse with ventilator, which later became the established Pueblo II type; (3) a rectangular pithouse with rough masonry walls and perhaps an enlarged "annex," as represented by several on Bonito Terrace, and in an advanced form by N.A. 1600 on the River; (4) typical Pueblo II wooden pithouses with ventilator and perhaps shallow or surface masonry storage rooms associated; (5) (to carry the series further) small masonry surface structures.

Correlation with Tables I and II would indicate that the house type series did not develop regularly in this small area. The masonry pithouse was developing at the time of the eruption, but after that event had a decided setback, for from then on the wooden pithouse appears to have been the most common. Although the house type series is not as clearly defined as other typologies already considered, it definitely indicates a broken evolution at the time of the eruption.

CONCLUSIONS

From the very nature of the data upon which this discussion has been built, and from the fact that it has been necessary to employ seriation in establishing a date, it is evident that it is not possible to date the eruption accurately to the year as is occasionally done with single rooms where the dates of all beams are identical. Also, because we have seen that it is possible for the building period to fall later than a few dates from a site, and since the abandonment must be somewhat later than the building period, ten years might be added to the last definite pre-eruptive date of 875, thus representing it as 885 plus or minus twenty-five years. This would imply that the eruption took place sometime very near 885 A. D., but it might conceivably have been as early as 860 A.D., or as late as 910 A.D.

If this date may be accepted as demonstrated, certain date-culture correlations may now be attempted. As pottery has in the past been the

most generally useful means of correlating series in the Southwest, an attempt is made to date approximately most of the styles we have isolated.

Of all the various styles established, the most crucial in the dating of the eruption seems to be Coil V. This style appears to have endured a short time, probably from about 850 to 900 A.D., or even shorter. Towards the end of this period, or about 900 A.D., Style V began to alter into more elaborate forms, and finally to develop into Style VI at about that date. The entire coil series was obviously in a stage of experimentation and groping on the part of the potters to establish a satisfactory means of vessel construction in which the surface was left rough. By about 900 they seem to have evolved Style VI, and from that date, for some time, it was a most popular form of decoration. One of the most interesting and valuable finds of the summer expedition of 1935 was the securing of a pot intermediate between Coil V and Coil VI, which, although crushed, was lying on the clay surface of the ground and was directly covered by fall cinders (Plate II). The form of this vessel is distinctly that of earlier styles than that of Coil VI, but the conformation of the corrugations is of this type. In the illustration, cinders may still be seen lodged in the depressions of the corrugations.

Coil styles II, III, and IV undoubtedly represent a short period, probably from about 850 to 900 A.D., of experimentation in various techniques of decoration. B/W I was well developed and established between 750 and 850 A.D., and probably survived sporadically as late as 875 A.D. B/W II appears to have been widespread as a style, and to have lasted a short time, between 750 and 800 A.D.

B/W style III should most properly be divided into two groups, as it enjoyed two periods of popularity. However, upon the physical criteria already listed, these two divisions cannot be made distinct. Style IIIa occurred most abundantly between about 850 and 875 A.D., when it seems to have gone slightly out of favor. Style IIIb began to develop about 1000 and lasted to about 1100 A.D., at which latter date it evolved into Style V. This recurring of the finer line as a decorative element was a forecast of the use of finer lines in the next (Pueblo III) stage. B/W style IV is the most typical B/W of the Pueblo II stage, and enjoyed a long time range, from about 875 to 1100 A.D. In the latter part of this time range it appears to have combined with Style IIIb to produce B/W V. B/W V, a characteristic early Pueblo III style, began its development about 1100 A.D. Poly. I also began its range about this time, 1100 A.D.

Architecturally, the house types follow a definite, though more erratic evolution. The first house type, the shallow pithouse without ventilator and with double supporting corner posts had developed about 750 and appears to have lasted until about 800 A.D. The second house type, the deep wooden pithouse with well-developed ventilator, was established about 800 and lasted to about 1100 A.D. The third house type, the deep, rough masonry-lined pithouse with or without an "annex," was established by 850 A.D. and lasted sporadically for at least 100 years, if not longer. The fourth house type, the deep wooden pithouse with ventilator and single corner posts, associated with small surface granaries or storage rooms, appears to have been established about 1000 and to have lasted to about 1100 A.D.

A third result of the work necessary to establish the date of the eruption of Sunset Crater is the recognition of slight differences between very small geographical areas. Culture influences are thus suggested, and definitely indicated in the more common occurrence of iron pigmented paints on pottery from the site on the Little Colorado River. A comparison of house types, and other culture characters, with those of outside regions indicates a distinct lag in many traits of the small sites in the immediate vicinity of the San Francisco Mountains. Many other conclusions of a similar nature might be reached by a further application of the seriation process.

BIBLIOGRAPHY

COLTON, H. S., The Geography of Certain Ruins Near the San Francisco Mountains, Arizona. Bulletin, Geographical Society of Philadelphia, Vol. XVI, No. 2, Philadelphia, April, 1918.

COLTON, H. S., Sunset Crater, the Effect of a Volcanic Eruption on an Ancient Pueblo People, Geographical Review, Vol. XXII, No. 4, American Geographical Society, N. Y., October, 1932.

HARGRAVE, L. L., Guide to Forty Pottery Types from the Hopi Country and the San Francisco Mountains, Arizona. Bull. I, Museum of Northern Arizona, Flagstaff, Arizona, April, 1932.

HARGRAVE, L. L. AND COLTON, H. S., Pueblo II Houses of the San Francisco Mountains, Arizona, Bull. 4. Museum of Northern Arizona, Flagstaff, Arizona, May, 1933.

HAURY, EMIL W. AND HARGRAVE, L. L., Recently Dated Pueblo Ruins in Arizona. Smithsonian Miscellaneous Collection, Vol. 82, No. 11, Smithsonian Institution, Washington, D. C., August, 1931.

SPICER, E. H., Some Pueblo I Structures from the San Francisco Mountains, Arizona. Museum Notes, Vol. 7, No. 5, Museum of Northern Arizona, Flagstaff, Arizona, November, 1934.

SPIER, LESLIE, Stratigraphic Technique in the Reconstruction of Prehistoric Sequences in Southwestern America. Methods in Social Science, Stuart Rice, Editor. Pp. 282–283, University of Chicago Press, Chicago, January, 1931.

SHELL TRUMPET FROM ARIZONA

HENRY J. BOEKELMAN[24]

AMONG the shells sent us for examination by Mr. Emil W. Haury, which were found in a Snaketown ruin of Hohokam culture (Gila River, Arizona), there is a partly-broken specimen of a west coast conch (*Strombus galeatus* Wood), No. 46,652. The only workmanship shown is the grinding down of the tip of the apex or spire of the shell, the hole thus formed permitting the blowing of the unbroken specimen (Figure 2). A slight sound still can be obtained upon blowing into the shell. The cracked condition of the porcelaneous texture of the shell with traces of blackened surface in places indicates its having passed through a conflagration. The pitted condition, due to sea-worm borings, clearly gives evidence that the shell was originally a "dead" or beach-worn specimen.

This specimen represents the sixth of its kind from the southwest territory, according to the recorded data in our files. The first appears to have been an identical conch shell reported by J. W. Fewkes in 1896 at Chevlon, Tusayan Pueblos (Arizona), with the statement that such a shell was probably used in ceremonials. He likewise reported that in the presentation of the *Palülükoñti* and *Soyaluña*, a similar shell, possibly of this species, is used to imitate the roar of the Great Plumed Serpent. Matilda C. Stevenson (1902), in speaking of the Zuñi ceremony of the coming of the Plumed Serpent, states that the priest constantly blows the *tse'klan'na* (great shell), making it appear that the serpent is keeping up a continuous roaring. She states likewise that the shell had a special keeper, and, "This shell would be used with the medicine (including tiny shells) if an attack were made upon the Zuñis, but at the ceremonials it is only blown, for if the medicine were used it would kill all the people." From these quotations we can obtain a slight indication of the religious awe in which these people held this sacred shell trumpet.

A second, similar archaeological find appears to have been made by G. H. Pepper in 1909. He reports the discovery at Pueblo Bonito, New Mexico, of twelve specimens of the same species of conch, and two Murex. Several of these trumpets had mouthpieces inlaid with turquoise.

When we informed Mr. Haury of the identification of this shell as a trumpet, we received the following information.

---

[24] Dept. of Middle American Research, Tulane University, New Orleans, Louisiana.

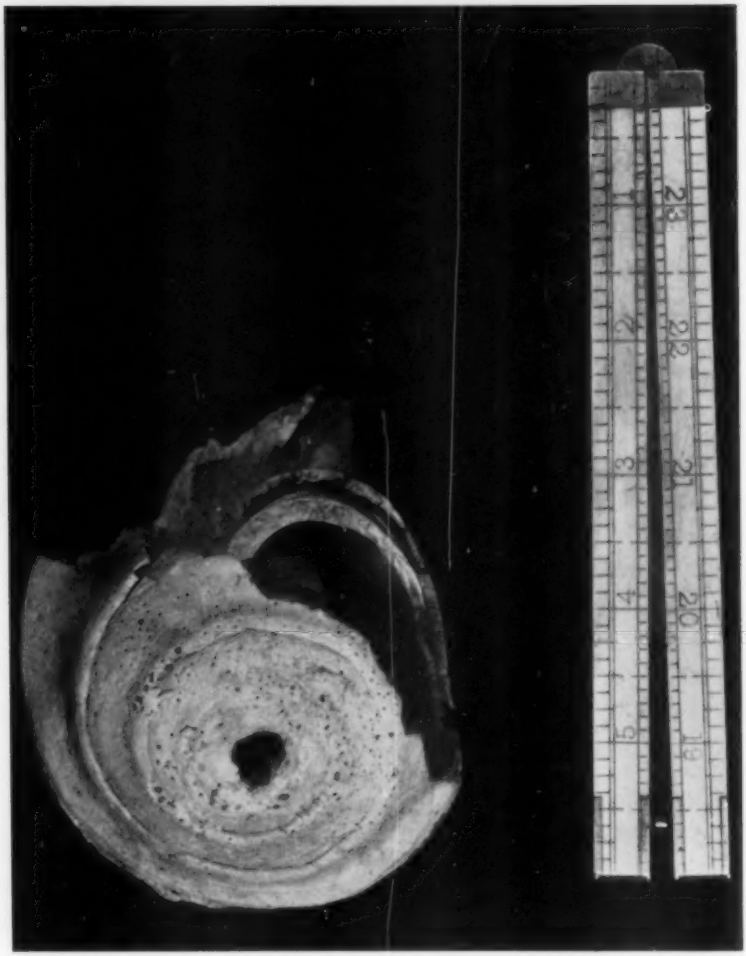

FIG. 2

While studying the shell material in the Hemenway material dug in southern Arizona about 50 years ago by Cushing, I found several trumpets of *Strombus galeatus* and one of *Melongena patula*. These came from Los Muertos, near Tempe, dating from the Classic Period of Hohokam development. These have been described, together with a few notes, in my paper on the Hemenway material to be published by the Peabody Museum at Harvard. . . . I must also add that we have found two Strombus trumpets in our ruin here at Gila Pueblo, dating from the 14th century. (Letter dated February 1, 1936.)

Finally, the writer found a broken specimen of *Murex nigritus* Philippi[25] amongst material sent him for classification from Waputki, northern Arizona. The fact that the apex of the shell was broken off would indicate its use as a trumpet.

Probably other finds have been made, but remain unreported and in "dead storage" at various institutions. A report of such material would prove of considerable interest, particularly when accompanied by dates of the ruin where found, as indicated by tree-ring chronology. With such information we could correlate with different periods the extent of the use of the shell trumpet among the various culture groups in the Southwestern area.

In tracing the distribution of shell trumpets in the western hemisphere, our map, now containing 120 separate archaeological finds or quotations of uses, indicates that their use ranged from northern Argentina to Canada. However, the most interesting fact is that the huge Mississippi Valley is as yet completely blank as regards authenticated reports of the use of the shell trumpet by the Indians. Historically speaking, our earliest quotation on their use is from Pennsylvania, where the Rev. John Woolman reports hearing the Delaware Indians blow a shell trumpet to call their companions to a prayer meeting in the town of Wehaloosing on the 17th of June, 1761. The Canadian specimen reported is a conch (*Strombus gigas* L.) now in the Toronto Museum (No. 21,364), and was used to call people to the long-house on the Grand River reserve, Tuscarora township, Ontario.

The Indian myths (outside of the Southwestern area) seem to be silent on the use of shell trumpets. Perhaps reports earlier than the Rev. Woolman's exist in writings of the early colonial days of the Atlantic coast.

While it would appear that the extensive use of shell trumpets, or "dinner horns," on New England and middle western farms, western cattle-ranches and southern plantations, to call their workers to meals,

[25] Identification by Mr. Howard Hill of the Los Angeles Museum.

was an introduction of a European custom, I am more inclined to believe there is a considerable possibility that the custom existed in North America prior to its discovery by the Europeans. Dr. F. W. Hodge (1910) reports the use of conchs as trumpets during historical times by the natives of eastern, southern, and southwestern United States. We know definitely that in Middle and South America large conch shells have been found in pre-Columbian sites, and their use reported by the earliest Spanish chroniclers, which firmly establishes their aboriginal origin. The question unsolved is whether their introduction in the eastern and southern states is due to the whites, or whether the latter copied their usage from the aborigines.

The solution, insofar as the Mississippi Valley is concerned, would appear to lie in an examination of these large conch shells stored in museums. If the apex or point of the shell is broken off, it is a possible indication of such a usage, but if the aperture in the spire has a smooth feeling when rubbed by the finger, we have the necessary proof of its use as a trumpet. Such smoothness, due in instances perhaps to the grinding down of the tip, is often caused by the friction of the lips upon the edges of the aperture, and likewise is an indication of the innumerable times the trumpet has been used, as the material composing these large conchs is quite hard.

Aside from material in museums, undoubtedly we have much in the ground as yet unrecovered. If all sea shells found, even though apparently unworked, would be saved with the same care that worked artifacts are preserved, it is quite possible that shell trumpets may be reported in some of the Mississippi Valley mounds. Time and again we have heard from field workers of excavations where unworked shells, and especially broken specimens, were not even removed from the sites. However, trained workers would not discard even an unworked sea shell.

If lack of storage space causes the average institution or collector to discard such duplicate shell material, particularly the large conch shells, please keep in mind that such donations would be of unestimable value to us in building up our study collections, and hence extremely welcome.

We are quite conversant with the pricelsss value to archaeology of wooden beams found at various sites, for the purpose of dating such ruins through the study of tree rings. Twenty-five years ago we find a statement published that the wooden beams uncovered in a certain Southwest ruin were in such a good state of preservation that they furnished an excellent source of fuel supply for the campfire!

Shells, particularly sea shells, in time will be recognized as occupying

just as important a role, particularly in reconstructing trade routes, and if correlated by means of the chronology supplied by tree-ring dating, which it is our sincere wish to carry out, will thus contribute towards supplying dates for the involved trade as well. Therefore let us not destroy additional pages of our prehistory, already so difficult to reconstruct due to missing data, by throwing aside shells simply because they may not show any traces of workmanship, or because they are partly broken.

Limited funds prohibit our visiting the various museums to examine the large conchs, some of which may have been used as trumpets, but it is our hope that those in charge of field work and collections may keep this question in mind. If such shells are found, we would greatly appreciate being advised of such a discovery, and where possible, securing duplicate specimens for our study collection.

After sending this article to AMERICAN ANTIQUITY, I ran across the following statement of a find of conch shells in a mound located near the city of Alton, Illinois, near the junction of the Missouri and Mississippi rivers:

> A day or two later, in digging on the northwest side of the mound, the workmen found near its base a mass of bones indicating another trench burial; but the only relics found with these remains were numerous sea shells of the species *Buscyon perversum*, which must have been brought from the Gulf of Mexico, concerning which it is worthy of note that the crowns or tops of the shells are missing, having apparently been cut off in each instance at about the same angle, indicating that one part or the other was made to serve some useful purpose in the economy of this strange people.[26]

To the writer this statement would appear to indicate very strongly that the only possible use made of these shells was that of trumpets. Showing this statement to Doris Zemurray Stone, Associate in Ethnology, Department of Middle American Research, Tulane University, New Orleans, she immediately informed me that Dr. Dickson of Springfield, Illinois, had told her he had found shell trumpets in the Hopewell culture district of Ohio. In fact, she thought that the existence of such trumpets in pre-Columbian mounds was a well-established fact. However, with all my research, I have been unable to find such a written statement in any of the publications devoted to the area of the United States in which earth mounds have been studied. It would seem that any credit for this discovery should, for the time being, go to Dr. Dickson.

[26] Henry R. Howland, Recent Archaeological Discoveries in the American Bottom, Bulletin Buffalo Society of Natural Sciences. Vol. III, No. 5, 1877.

A METHOD FOR DETERMINING THE TEXTURE OF POTTERY

LYNDON L. HARGRAVE[27] AND WATSON SMITH[28]

MOST STUDENTS of pottery types have met with difficulties in selecting descriptive terms which would convey the intended idea. Particularly is this true where varying degrees of differences or similarities were being discussed. Since description embraces all characters of pottery, relative terms are unavoidable. One important character of pottery, namely texture, even when description thereof has been attempted, has been inadequately described, the terms used being wholly meaningless to persons unfamiliar with the character in question, and having little value even to those more familiar with the pottery. This is because relative comparative terms have been used. A method is here submitted for standardizing the descriptive terms of texture so as to leave no doubt regarding the exact meaning of the term employed.

Guthe[29] says: "There are four attributes of the paste or body which must be taken into consideration in rendering an adequate description." The second attribute, he says, is texture. "The cross-section of a specimen discloses at once the degree or thoroughness with which the potter treated the paste before construction. In crude pottery the paste usually has an *irregular texture* (italics ours), with varying degrees of fineness not only within a single cross-section, but also in different parts of the same piece. In the technically more advanced pieces, levigation causes a *uniform* (italics ours), fine texture."

Guthe's idea of texture would thus seem to be "the degree of thoroughness with which the potter treated the paste before construction" and is described as "irregular" and "uniform." Size of temper is indicated in "crude pottery" and in "the technically more advanced pieces," implying that the "cruder" the pottery, the coarser the temper.

Cushing,[30] Kidder,[31] Gladwin, W. and H. S.,[32] Roberts,[33] and Mera[34]

---

[27] Field Director, Museum of Northern Arizona, Flagstaff.
[28] Research Associate, Museum of Northern Arizona, Flagstaff.
[29] 1927, p. 24.
[30] 1886, pp. 493–494.
[31] 1924, p. 107.
[32] 1931, p. 27; 1933, p. 26.
[33] 1932, p. 112.
[34] 1934, p. 6; 1935, pp. 8, 14, 25, and 27.

all make references to texture, but in no instance do they make clear their meaning and use of the term. These examples clearly illustrate the loose use of the term "texture," and although each of these writers undoubtedly understood his own use, their meaning need not necessarily have been the same.

Bunzel,[35] Kidder and Amsden,[36] like Guthe, place great stress upon temper and refer to texture, although like the above group of writers no attempt was made to define the word. Hargrave,[37] following Guthe's lead, likewise stressed the importance of texture in describing pottery by stating that "texture refers to the mixture of clay and temper."

The consideration of texture is thus seen to have been long regarded an important characteristic in the description of pottery types. As Amsden[38] points out, and as is known to most students of the subject, it is sometimes the only objective criterion by which several divergent types can be distinguished. But without an easily applied and reasonably definite standard, descriptive terms have little value. Such words as coarse, fine, smooth, and granular do convey some meaning but are at best vague, and represent only a subjective standard which exists in the mind of the writer alone. In order to inject some semblance of uniformity into pottery descriptions compiled by different writers, so that they may be satisfactorily compared with those of other writers, words which have a definite meaning must be used by everyone.

The following system is therefore presented in the hope that it may serve the purpose of clarification. However, we must make certain of the precise nature of the subject under discussion. We are considering herein the physical or tangible, not the chemical or mineralogical properties of the constituent elements which appear in the walls of pottery vessels after they have been fired, as well as the relation of these elements to each other. Further, we are concerned with those elements as they appear not on the finished or modified surface of a vessel, but within the walls of the vessel. The word "wall" is, however, too broad a term, for it includes its own surfaces. The word "core" is therefore proposed, and is here defined as: all of that portion of the wall of a pottery vessel which lies between the actual surfaces, but does not include the surfaces, and which is visible only in a cross-section of a vessel wall after the latter has been fractured. The texture of this core is herein defined

[35] 1929, pp. 6–7.
[36] 1931, pp. 23, 68–69, 101, and 131.
[37] 1932, p. 9.
[38] Kidder and Amsden, pp. 68–69.

as: the visual or tactile character of the core of a pottery vessel, which results from the arrangement, size, shape, and relative quantities of the individual particles composing the core, regardless of color or chemcial composition.

Conceivably, many standards for determining texture might be devised. With the aid of micro-photography the actual sizes of individual grains of temper can be measured; their number per unit of area can be counted; their regularity of disposition can be calculated. By means of some set of standards their abrasive qualities can be determined. All these factors do indeed enter into a complete analysis of *texture* as defined above, but for the use of the archaeological field worker they are impracticable. Such a worker has only his eyes and his hands to rely upon, and a standard, to be useful to him and to those who read his published findings, must be one that can be unerringly applied by eyes and fingers unaided except, perhaps, by a hand lens.

If one were discussing two or three different types of pottery, it might be sufficient to describe them comparatively in terms of each other; that is, to state that the texture of one is less fine or coarser than that of another. But it is usually the case that a student must distinguish his material not from one or two other types but from literally hundreds, examples of which are unavailable for direct comparison. Of course all words are in a sense comparative; "fine" can be understood only as a correlative of "coarse;" but somewhere there must be established an absolute, or rather a series of absolutes, the nature of which can be definitely determined by every worker and writer, and to which all questionable material can be referred. Such a series must, however, be simple enough for quick and practicable application. With these considerations in mind, such a series is hereby proposed, consisting of five absolutes, to be referred to uniformly as *very coarse*, *coarse*, *medium*, *fine*, *very fine*. The mutations of pottery texture are not so wide that all examples cannot be fitted into these categories.

It would be possible to define painstakingly each of these terms, but as has been said, such a method would be extremely cumbersome. Words cannot serve the purpose as well as physical examples. Such examples have already been set aside at the Museum of Northern Arizona, and in all descriptions of pottery types published hereafter by the Museum, the character of the texture thereof will be designated by one of the five terms above listed, and can be relied upon as corresponding as nearly as possible to the character of the standard example for the particular term used.

Admittedly this method is to some extent scientifically inexact, but it does provide a usable rule of thumb which can be applied not only in the Southwest but wherever pottery analyses are made. It does not take into consideration as separable factors the actual dimensions or shapes of temper particles, their relative abundance or color, their degree of hardness, their mineralogical composition, the regularity of their distribution throughout the core, or the porosity or hardness of the core itself. All these factors are important and they should be considered in any complete and systematic description of a pottery type; but, although they are all to a certain extent contributory to texture, they cannot individually be utilized as determinants of texture. The analysis of each of them is the subject of separate consideration and therefore is not discussed here.

In order, however, for the proposed method to be of real service to all who are interested in pottery classification, the standard examples must be generally available. The absolute series at the Museum of Northern Arizona will be available at all times for comparative purposes and, as in the case of duplicate type material,[39] on occasion, duplicate series illustrative of texture designations can be made up for distribution. However, there are described types which will illustrate each of these varying degrees of texture since each, almost without exception, is restricted to a single degree. Descriptions of pottery type examples listed herein may be found in referring to *Guide to Forty Pottery Types from the Hopi Country and the San Francisco Mountains, Arizona*.[40] Examples are as follows: Very coarse (Jeddito Plain, p. 25), Coarse (Tusayan Corrugated, p. 13), Medium (Tusayan Polychrome, p. 22), Fine (Deadmans Black-on-red, p. 18), Very fine (Jeddito Black-on-yellow, p. 29).

Moreover, the Museum of Northern Arizona will at all times be glad to furnish to students and workers such duplicate series for a nominal monetary consideration to defray the cost of selection, packing, and shipping.

[39] Hargrave, 1935.
[40] Hargrave, 1932.

BIBLIOGRAPHY

BUNZEL, RUTH L. 1929. The Pueblo Potter. Columbia University Press. N. Y., 1929.

CUSHING, FRANK HAMILTON. 1886. A Study of Pueblo Pottery as Illustrative of Zuñi Culture Growth. 4th A.R., B.E., pp. 473–510. Washington, 1886.

GLADWIN, W. AND H. S. 1931. Some Southwestern Pottery Types: Series II. Medallion Papers, No. X. The Medallion, Gila Pueblo, Globe, Arizona. June, 1931.

1933. Some Southwestern Pottery Types: Series III. Medallion Papers, No. XIII. The Medallion, Gila Pueblo, Globe, Arizona, December, 1933.

GUTHE, CARL E. 1927. A Method for Ceramic Description. Papers of the Michigan Academy of Science, Arts, and Letters. Vol. VIII, pp. 23–29. Ann Arbor, Michigan, 1927.

HARGRAVE, LYNDON L. 1932. Guide to Forty Pottery Types from the Hopi Country and the San Francisco Mountains, Arizona. Museum Northern Arizona, Bull. 1. Flagstaff, 1932.

1935. Concerning the Names of Southwestern Pottery Types. Southwestern Lore. Vol. I, No. 3, pp. 17–23. Gunnison, Colorado, December, 1935.

KIDDER, A. V. 1924. An Introduction to the Study of Southwestern Archaeology. Department of Archaeology, Phillips Academy, Andover, Mass., Yale University Press, New Haven, Conn., 1924.

KIDDER, A. V. AND AMSDEN, C. A. 1931. Pottery of Pecos. Vol. I, Pt. 1 (by C. A. Amsden) Phillips Academy, Andover, Mass. Yale University Press, New Haven, Conn., 1931.

MERA, H. P. 1934. Observations on Archaeology of the Petrified Forest National Monument. Laboratory of Anthropology, Technical Series, Bull. 7. Santa Fe, New Mexico, 1934.

1935. Ceramic Clues to the Prehistory of North Central New Mexico. Laboratory of Anthropology, Technical Series, Bull. 9. Santa Fe, New Mexico. August, 1935.

ROBERTS, FRANK H. H., JR. 1931. The Ruins at Kiatuthlanna, Eastern Arizona. B.A.E., Bull. 100. Washington, 1931.

1932. The Village of the Great Kivas on the Zuñi Reservation, New Mexico. B.A.E., Bull. 111. Washington, 1932.

CORRESPONDENCE

Archaeological Blundering

The dictionary defines "mistake" as the interchange of one thing for another through haste, etc., and a "blunder" as a mistake or error of a gross kind, through carelessness, ignorance, or stupidity.

In Vol 1. XXIV, Nos. 2–3, 1935, of the Museum Journal of the University Museum, Philadelphia, reference was made by the author to the discovery of three bone awls in a deep hearth in Burnet Cave, near Carlsbad, New Mexico. These "bone awls" have since proven to be horse bones and do not appear to have been worked at all. Two of the bones are the splint bones of a horse, and one is a nasal bone, probably of a horse also.

These particular bones resemble very closely those that have been worked into awls, as shown in Figure 3, and it is easy to mistake them for actual awls. Both are from cave deposits. Of the "awls" shown in the illustration, the first, second and fourth specimens in the top row, counting from left to right, and the first and third specimens in the bottom row are actual awls from Basketmaker caves in Utah. The other three specimens, from Burnet Cave, New Mexico, are not awls. Left-hand specimen in top row, 3¼ inches long.

Fig. 3

This brief notice is not only to correct an unintentional mistake, but to point to the necessity for careful examination of animal bones in archaeological deposits.

EDGAR B. HOWARD
University Museum,
Philadelphia, Pennsylvania

SURVEY METHODS

Apropos of Mr. Robbins' letter on survey methods, the Van Epps-Hartley Chapter has used an exactly similar method of designating sites, in its survey of this area. Our method was upset recently by the adoption by the New York State Planning Board of an official number system for New York State topographic quadrangles, differing from that which we had been using, and which was the seemingly more logical system used by Mr. Robbins, by the Gila Pueblo, and by a number of other surveys. Since it *is* an official system, we will use it, but it might be well for others who are contemplating such work to check with their state boards before making an extensive survey according to some system of their own, no matter how good it may be. For the benefit of outsiders who will later refer to their data, it is advantageous to reduce the number of different systems to a minimum. On the other hand, where there are no official state systems, it is of distinct advantage to make use of a system which has been generally adopted by workers in other states and which might eventually be made uniform for nation-wide site surveys under the aegis of some such group as the *Society for American Archeology*. The system which Mr. Robbins describes, which we formerly used, and which is on the whole the most logical simple system which is generally applicable, meets these conditions admirably. The Society could well advocate the general use of this scheme, or some modification of it, in reducing survey data throughout the country to a common basis.

P. SCHUYLER MILLER
Secretary-Treasurer
Van Epps-Hartley Chapter
N.Y.S. Archeological Association

SHOULD WE DAMN THE PRESS?

There are those who would abbreviate this title.

Some years ago a companion and I drove to Florida to investigate a report which had reached us concerning a burial mound the contents of which had been exposed by a Gulf storm. Our automobile had been left for safe keeping at the police station in Pensacola and our belated return had caused some anxiety on the part of the chief; in fact, newspaper headlines had already proclaimed, "Scientists Feared Missing." The news of our return soon reached the press

office. Fatigued from a rough journey over water, we were somewhat indisposed when the reporter arrived. A great scoop on the front page met our withering gaze the following morning. The most lurid press account of King Tut's tomb was like the description of a grave in the potter's field in comparison to that of our discoveries! Fearing that foul play might befall us and our treasures, consisting of a few skeletons, pots and potsherds, we pulled down our hats and sped out of town.

The reader will doubtless recall one of the most flagrant examples of press sensationalism which occurred a few years ago when the unwary owner of an excavated prehistoric village gave free rein to several reporters whose reputations for bombast are second to none. The press throughout the country fairly shrieked with archaeological absurdities. Prehistorians took up arms and so did the scientific periodicals. Being well acquainted with this man, I discussed the situation with him. The admission was made that he did desire publicity, but it was plain to see that the whole thing had gotten beyond his control and that a mole hill had turned into a mountain. At the peak of the conflagration, an eastern newspaper syndicate made him a $10,000 offer for his cooperation in dragging the controversy into the limelight. Fortunately he avoided the snare. His enterprize prospers today and archaeology escaped a stinging stench which would have touched the heavens.

Mindful of such considerations, many investigators feel that a let-alone policy toward the press is highly advisable. Then, too, there are those who seek an audience only from the direction of their colleagues. Perhaps the practicability of this policy ought to be questioned on the basis that public money supports their researches, and builds and maintains the museums and other institutions which employ them. It might also be asked whether there exists a director or curator of a museum these days who is not gravely concerned over the lack of interest in archaeological exhibits which is being shown by the average museum visitor. Perhaps the lack of this interest may be due to the prehistorian's failure to awaken the consciousness of the public through the medium of the press to the significance of his findings which are so painstakingly arranged in museum cases.

Let us examine a few more of these sanguine abortions of the press before we take up the matter of therapeutics. During an extensive investigation in Tennessee in 1934, with which I was connected, an Associated Press reporter came to me for information. Having been cautioned by my chief to ignore all reporters, I referred the man to him. Apparently, however, the reporter had been instructed to complete his assignment that day and so proceeded to make his own observations. The article which appeared the following day consisted largely of quoted statements for which, it was alleged, I was responsible. If the article contained a true statement at all, it was a mere coincidence. My chief contacted me over the long distance telephone to inform me that he had just read the article and sincerely regretted my being a party to such atrocious statements. Several days later the same sheet carried another article in which my

chief was erroneously awarded the responsibility for statements, compared to which those cited in the previous article were empty nonentities. My exoneration was quite complete.

When a reporter receives an assignment and fails, he faces the danger of losing his job. We are not concerned with that contingency, but we ought to be concerned with what might result from the pressure of circumstances. Either a flat refusal to release any information whatsoever or failure to supply adequate information nearly always results in the type of article which leaves the public in considerable doubt as to any justification for archaeological research. Controlled popularization can produce highly desirable results. It offers an avenue through which the pot-hunter and the public in general may acquire a greater appreciation of prehistory; it can encourage school children to search for village sites and gather surface collections; it can cause numerous individuals to submit reports concerning archaeological evidence encountered to the institution sponsoring the articles and, finally, much can undoubtedly be accomplished by way of arousing a greater appreciation for the meaningless objects displayed in museum cases.

There is much advantage to be gained by calling the same reporter whenever a release is to be made. In his eagerness to obtain further releases, he will hold his imagination under control. There should always be a definite agreement that the final article be submitted for the informant's approval before it goes to press. Obviously, any information or photographs which are apt to incite the looting of graves by curious individuals should not be included.

T. M. N. Lewis
University of Tenneseee
Knoxville, Tennessee

Former Indian Sites in Maryland, as Located by Early Colonial Records

Dr. D. S. Davidson's interesting article in American Antiquity, Volume I, No. 2, has encouraged me to submit certain references pertaining to the Indians of Maryland which have come to my attention. Concerning the Conoy Indians (Piscattaways) Mr. Davidson says (p. 85): "For the Conoy of Maryland . . . there seem to be no direct accounts of treatment of the dead."

Searching for evidence on this subject is indeed like looking for the proverbial needle in a haystack. A solitary record is the reward of long research. In the month of August, 1678, Nicotagsen, then Emperor of Piscattaway, together with the "speaker" of that people and other Indian notables, presented himself to Lord Baltimore's Council, then in session, on a matter of business. When questioned as to why some of their chiefs absented themselves from this meeting, the Piscattaways offered the following excuse: "Most of their great men

were very busie in gathering together their dead bones."[41] This remark undoubtedly has reference to a burial custom.

Dr. Davidson refers to a protest submitted to the (Maryland) authorities in the year 1686 by the "Nanticokes at Assateague." against certain English persons who were charged with having vandalized the tombs of the Indian kings and with having stolen from these tombs quantities of "roanoke and skins" (p. 86, note 6). He refers to MacLeod, whose work I have not consulted. There is no doubt in my mind as to the identity of the original record on which these remarks are ultimately based; but inasmuch as this record has a sense quite different from that which Dr. Davidson, quoting MacLeod, appears to attribute to it, I am led to infer that the latter has not quoted it in full. This record is entered in the proceedings of the Council of Maryland and bears date May 6th, 1686. It reads as follows:

"The King of Assateague complaines that severall of the Inglish . . . (naming five) . . . were come and seated among them in the very Towne where they live . . . (referring to Quaponqua or Copomco Indian Town, which was situated on Pocomoke River, northwest of the site of the modern village of Newark, in Worcester County, Md.) . . . but particularly he complaineth against Edward Hamond for that whereas it is a custom among them upon the death of an Indian King to save his bones and make a case with skinns wherein they inclose the bones and fill it up with Ronoke (sic), and other their riches, he the said Hamond about a month since had upon like occasion of one of their kings dyeing stolen away the skinns and roanoke from the place where he was layd," etc.[42]

The Assateagues inhabited the seaboard side of the eastern shore of Maryland in early historical times. It is not unlikely that they were related to the Nanticokes and had similar language and customs; but politically they were treated both by Maryland and by Virginia as a separate people. War was made on them by Virginia in 1659, and it is probable that the two towns which they are known to have lived in later in the century were places of refuge, not their original home. Those Indians who, some time before 1705, settled at the head of Indian River, in what is now Sussex County, Delaware, where a reservation was laid out for them in 1711, for which a Maryland patent was soon afterwards obtained, are identifiable as a band of Assateagues, in which there had entered an admixture of other Indian strains, among which an element of Choptank is discernible. After 1705 and until the middle of the eighteenth century, after which we hear no more of them, they are mentioned in Maryland records under the name of Indian River Indians. The site of their reservation is on the head of Indian River and on the southern side of the river, and it is certainly not

[41] Maryland Archives, Vol. XV, p. 185; see also my article on Piscattaway in the Maryland Historical Magazine, Vol. XXX, No. 3, p. 190.

[42] Maryland Archives, Vol. V, p. 480; referred to in my article on Piscattaway, Md. Historical Magazine, Vol. XXX, No. 3, p. 191.

far from the place where the so-called "Nanticokes" are now living. All of it, however, was disposed of before 1744, and what thereafter became of these Indian River Indians is a mystery, since it was not long after this that Maryland had no further concern with their destiny.

I suspect that the modern "Nanticokes" are their direct descendants. I should add, however, that I have received from Mr. A. Crozier, President of the Archaeological Society of Delaware, a piece of information which tends to modify this theory. Among these "Nanticokes" of today Mulberry is a family name. This was the outstanding family name of that remnant of the Choptanks living at Locust Neck Town, on Choptank River above Cambridge, during the latter half of the eighteenth and the beginning of the nineteenth century.

Dr. Davidson alludes to a Nanticoke custom of mummifying the bodies of chiefs and of preserving the mummies in "temples" constructed for that purpose, "probably much the same as in Virginia." He quotes MacLeod as saying in substance: "In Dorsetshire, Maryland . . . (this can mean only Dorchester County, which lies along the southern shores of Choptank River) . . . the 'body' of the last local chieftan, who died between 1712 and 1717, was preserved in a temple until 1780." Unquestionably this information originated in a letter of Dr. William Vans Murray, of Cambridge, Dorchester County, Maryland, addressed to Thomas Jefferson and dated September 18th, 1792, which is quoted in full by Dr. Frank G. Speck in an article dealing with the Nanticoke and Conoy Indians.[43] Dr. Murray makes the following allusion to one of these mortuary temples:

"Wynicaco, the last king crowned of the Nanticoke tribe, he died at past 80 years since. His body was preserved and very formally kept in a Quacasumhouse—chio-ca-son house, 70 years dead."[44] In another place Dr. Murray refers thus to Wynicaco: "no king having succeeded their famous Winikake, who died 75 years since."

Of "Wynicaco" (Winnicaco, Winikake, Winogago, Wenegaco, Winnoughquarquo), whom Murray styles "the last king crowned of the Nanticoke tribe," there are several records. He was the son of Ababco, who, during most of the latter half of the seventeenth century, was king of the Choptank Indians inhabiting the lower Indian town on Choptank River. The Indians of this town, which was situated some little distance above Cambridge, Maryland, were specifically known to themselves as "Transquakines," but came to be known to the English as "Ababcos" or "Babcos" from the name of their king. Winnicaco made a treaty with Maryland May 18th, 1705.[45] In this treaty he is styled "Winnoughquarquo, King of the Babcos." On March 9th, 1705 (Old Style; this was in March, 1706), with other Choptank chiefs and "great men," he

[43] The Nanticoke and Conoy Indians, with a Review of the Linguistic Material from Manuscript and Living Sources, Frank G. Speck, Papers of the Historical Society of Delaware, N.S. No. 1, 1927.

[44] Ibid., pp. 39–40.

[45] Maryland Archives, Vol. XXV, p. 442.

deeded to Wm. Seward a small tract of land within the Choptank reservation on Choptank River.[46] This, so far as I can discover, is the last we hear of him. In 1722 Betty Caco, his daughter, was Queen of the "Ababco" Indians.[47] Together with other Choptank Indians, on Sept. 9th, 1726, she conveyed to Edward Newton a parcel of land out of the Choptank reserve.[48] In this deed she is described as "Betty Caco, Queen of the Ababco Indians, daughter and heir of Winnecaco late of Dorchester County, Deceased, who was Ruler and King of the af[d]. Ababco Indians." It is evident that there is nothing, in the records concerning Winnecaco which have come to our notice, to contradict Murray's statements as to the time of his death.

Dr. Murray does not take the trouble to distinguish between Nanticokes and Choptanks, although his information is concerned exclusively with the latter.

I do not find anywhere else direct reference to this most interesting burial custom of the Choptanks. I am therefore having recourse to land records and place-names for whatever corroboration of Dr. Murray's statement, however slight, may be found in them.

In a Proprietary rent-roll of Somerset County, Maryland, there is twice entered a tract of land containing five hundred acres, which was surveyed for James Wetherly on December 1, 1688, and is described as being situated in Nanticoke Hundred of the said county, on the south side of Nanticoke River. The exact location of this tract I have not as yet determined. In the first entry it is called "Quiakeson Neck," and there is no description as to location other than that already mentioned. The second entry reads as follows: "Nanticoke Hundred—500 (acres)—Quiankeson Neck—surv[d] for James Weatherly 1st of December, 1688, lying on the so. side of Nanticoke River, beginning at a marked pine by a swamp near Indian Quiankeson houses."[49] "Quiakeson Neck," otherwise called "Quiankeson Neck," was doubtless so named because it was the site of the "Indian Quiankeson houses." May not these "houses" have been mortuary temples for mummies similar to the "Quacasum-house" mentioned by Murray? The resemblances in these names are certainly striking enough to suggest this theory, and no other explanation of the meaning of "Indian Quiakeson houses" seems to be forthcoming.

What appears to be another instance of the occurrence of this Indian word is found among the land records of Dorchester County. An August 15th, 1761, a land commission was held on behalf of William Murray, in order to fix the bounds of a tract of land called "Ennalls' Outrange."[50] It may be worth noting that this William Murray was Dr. Wm. Vans Murray's grandfather. In the preamble to the proceedings of this commission we are informed that the bounds of

[46] Dorchester County Records, Deed Book No. VI [Old], 1702–1716, folio 87.

[47] Maryland Archives, Vol. XXV, p. 393.

[48] Dorchester County Records, Deed Book VIII [Old], 1720–1732, folio 142.

[49] Somerset County rent-roll, Calvert Papers No. 885, pp. 146, 167; manuscript, Maryland Historical Society Library, Baltimore, Md.

[50] Dorchester County Records, Deed Book No. XVIII [Old], 1761–1763, folio 75.

"Ennalls's Outrange" are known to depend "upon one of the Choptank Indians bounded trees standing in *Cuiackason* Swamp." Henry Ennalls testified that twenty years before he was shown a bounded white oak, since cut down, which "was commonly reported to be one of the Indian Bounders of the old original tract of the Indians land." The commissioners found that the aforesaid tree had stood "in a large swamp about ¾ of a mile to the eastward of Thomas Manning's dwelling plantation." Obviously they had reference to the swamp called Cuiackason Swamp.

Was the site of that "Quacasum-house" where, according to Murray, the mummy of "Whynicaco" lay in state for so many years, within the confines of "Cuiackason" Swamp? Possibly so. I think it more likely, however, that this "temple" was located in one of the Choptank towns, where it might the more easily be guarded against the intrusion of vandals. Moreover, the Indians, some time before Winnecaco's death, alienated that part of their reservation which lay in or adjacent to this swamp. If, as I deem it most likely, the name of this swamp has significance in connection with the subject which is under discussion, it doubtless harks back to a time when the homesteads of white settlers were few and far between in Dorchester County, excepting along the rivers. Beacuse of the interest which may attach to its name, it may not be out of place to tell what is known as to the location of Cuiackason Swamp, although its exact situation and identity have not been established. It should be remembered that courses and distances in old Maryland land patents and deeds are often erroneously stated, errors which must needs be corrected by later land commissions and resurveys. One of the causes of these mistakes is picturesquely set forth in a deposition taken in the year 1741 and entered among the land records of Dorchester County.[51] The deponent, Edward Willoughby, aged seventy-one, quotes Mr. Smithson, a former surveyor of those parts, as saying: "There was great allowance given to People for that they went ashore at one place and rowed along shore to another and Bounded Trees and sat their courses for fear of the Indians." With this in mind let us see what records tell us about the location of the swamp. A bounded tree of the Choptank Indian reservation stood within its confines. This tree was a boundary of "Ennalls' Outrange" In the year 1820 Charles Goldsborough obtained a warrant to resurvey "Ennalls' Outrange," together with four adjacent tracts or parts of tracts of land, including "Ricarton" and "The Indian Land alias Indian Survey" (i.e., part of the old Choptank reservation).[52] Ricarton is a tract of land which antedates the reservation by several years. It occupies the northwest corner of the reservation and is that part of it on which Cambridge was laid out. The reservation was surveyed for the Choptank Indians by act of Maryland Assembly in the year 1669. The place of beginning is on Choptank River, about half a mile west of the mouth of Cambridge Creek and within the present limits of the town of Cambridge. The

[51] Deed Book XIV, 1745–1753, folio 203.

[52] Land Office, Annapolis, Md., Eastern Shore Warrants, No. 12, 1818–1842, Warrant No. 1591.

reservation ran up the river to the mouth of Secretary's Creek, now called Warwick River, It was towards that end of it that the Indian towns were situated. It extended back into the woods from the river for a distance of three miles. Now, there is recorded at Cambridge, Maryland, a deed bearing date January 15th, 1702/3, whereby Winacaco, "otherwise called Onocknatoone, Ruler and King of the Abapco's," conveyed to John Kirke a parcel of land "being the Lowermost part of a Tract of Land that my Predecessors Ababco, Dickwasine (Tequassino) and Harswamp (Hatsawap) had of the guift and grant of the Assembly of this Province."[53] The land so conveyed begins "at the uppermost bounded tree of William Dorrington's freehold." This was the original beginning of the whole Indian reserve. From it the first line of the deed runs "south into the woods for length nine hundred and sixty perches (three miles) to a marked white oak." This marked white oak, in my opinion, was that same white oak tree, one of the Choptank Indians' bounded trees, which stood in Cuiackason Swamp. There is also recorded at Cambridge a deed dated August 13th, 1704, whereby, for a valuable consideration, including forty pounds sterling and the three hundred and twenty matchcoats, Winacaco, otherwise called Onoocknatoon, and other Choptank chiefs conveyed to Thomas Ennalls a tract of land called Ennalls Purchase, containing three thousand six hundred and sixty acres, being part of their reservation on Choptank River.[54] One of the boundaries called for in this deed is described as "a bounded white oak being the southernmost bounded Tree of sayd Land given by Act of Assembly as aforesaid and standing by the Road side that leads from the Towne of Yarmouth to the Towne of Cambridge neer to widdow Kings." The town of Yarmouth, or Little Yarmouth, seems to have been situated on the northern branch of Transquaking River, not far above the mouth of the Chicamacomico, in Dorchester County. It was a port of entry, but its use as such was discontinued in 1707. With these facts in mind it seems likely that the swamp called Cuiackason Swamp was situated within a mile and three-quarters of the present limits of Cambridge and to the southward of the town, and within three-quarters of a mile to the eastward of the source of Little Blackwater River. Modern maps show no swamp at this place, but a heavy swamp begins about a mile southeast of it and extends for nearly four miles in the same direction towards Transquaking River.

Dr. Davidson alludes to an article by H. C. Mercer, published in 1897 and entitled: *Exploration of an Indian Ossuary on Choptank River, Dorchester County, Maryland.* He describes the site of Mercer's "exploration" as "a late historic one occupied by the Nanticoke until 1722, at which time the district was sold by the Indians to Europeans." I have not seen a copy of Mercer's article. Cambridge people appear to know of but one site on the Choptank which answers the description of an Indian ossuary. That site is among the sand banks of Sandy Hill, which is situated on the river about a mile below

[53] Dorchester County Records, Deed Book No. VI [Old], 1702–1716, folio 5.

[54] Dorchester County Records, Deed Book VI [Old], 1702–1716, folio 47.

Cambridge, between Hambrook's Point and the mouth of Jenkins Creek. There is a tradition of excavations made there under scientific auspices thirty or forty years ago. Perhaps this has reference to Mercer's exploration. Later "diggings" have taken place under less happy circumstances. They culminated a few years ago, when quantities of sand were removed and many Indian artifacts are supposed to have found their way into the maw of a concrete-mixer. There are at present in private collections at Cambridge many objects of very fine workmanship which came from Sandy Hill. This place lies a mile down the river from the western limits of the Choptank reservation of 1669 and was never deeded by Indians to Europeans. Settlement of that part of Maryland by the English began in 1658. At that time the Choptank Indian towns would seem to have been three in number, the westernmost of which was situated on the river at a distance of three or four miles above the site of Cambridge. Just before the Maryland Assembly granted them their reservation, in 1669, the three kings of the Choptanks, Ababco, Tequassino and Hatsawap, representing the three towns, requested that no English be allowed to settle on the south side of the Choptank above William Stevens Creek, which I would identify from land records as Jenkins Creek. Had this request been followed literally, Sandy Hill would have been included in the reservation. If this is the place where Mercer conducted his exploration, and if his deductions regarding the age of the site are correct, it must have been known to these Indians. To a surface collector like myself, the fine quality of the artifacts found at Sandy Hill is so striking and, for Maryland, so seemingly exotic, that I can not but believe that it was once a burial-place of considerable significance.

William B. Marye
Baltimore,
Maryland

The Archaeological Attitude

The following quotation from a book by Robert Henri: *The Art Spirit*, although intended for artists and students of art, applies equally well to students of archaeology:

"Every *student* should put down in some form or other his findings. All any man can hope to do is to add his fragment to the whole. No man can be final, but he can record his progress, and whatever he records is so much done in the thrashing out of the whole thing. What he leaves is so much for others to use as stones to step on or stones to avoid.

"The *student* is not an isolated force. He belongs to a great brotherhood, bears great kinship to his kind. He takes and he gives. He benefits by taking and he benefits by giving."

Herbert W. Kuhm
President, Wisconsin Archeological Society,
Milwaukee, Wisconsin

NOTES AND NEWS

Arctic Area

A party headed by Dr. Aleš Hrdlička, Curator of Physical Anthropology at the United States National Museum, left Seattle, Washington, on May 16 for the fifth summer of archaeological research on Kodiak Island, off the Alaskan coast.

Pacific Coast Area

The University of Oregon last summer had a small party in the field in southeastern Oregon. A short time was spent making exploratory diggings at the site where the Bureau of Reformation had found two knives the previous autumn. These knives, from geological evidence, give every evidence of being late glacial or early post-glacial. The manuscript describing that work is now being prepared.

The party then spent three weeks beginning excavation in a large rock shelter above an old lake, now dry, in the southeastern part of the state. The work seemed to indicate three strata of culture: one, a surface Paiute; two, a deep stratum characterized by twined basketry, twined sagebrush-rope sandals, arrows with wooden foreshaft, cane shaft and wooden butts; three, a manifestation lacking the basketry and twine but characterized by a number of knives and large points. Animal bones were almost entirely lacking in this stratum. One knife is very similar to one of the Wikiup (Deschutes) knives.

It is practically impossible at the present time to relate the middle-stratum culture to that of any known area. Weltfish thinks the basketry is northeastern California, that is, Modoc or Klamath type, but the present knowledge of other phases of Klamath culture and Klamath habitat does not fit into this. Some other finds in the caves in the Deschutes region and caves on the Crooked River are almost exactly like these, indicating a culture that was developed around these great lakes in eastern Oregon, now dry, when they contained at least some water. It is planned to continue the work in this cave this summer, providing funds are available.

During the summer of 1935 Mr. David B. Rogers, Curator of the Santa Barbara Museum of Natural History, spent three months in field work in the interior of the Santa Barbara Forest Reserve in a practically unknown and trackless region adjacent to the rugged Hurricane Deck region. The results were most gratifying. Work here was started under the stimulus of reports of a painted cave. Dozens of caves were found, all showing evidences of long occupancy, and with many fantastic paintings on the walls. One untouched cemetery was also partially explored, with splendid results. This region, when its exploration is completed, promises to add an interesting chapter to the prehistory of southern California.

The Santa Rosa Junior College has a museum of some ten thousand specimens from all branches of natural history. The local archaeology is generously represented. The building up of the collection has been under the guidance of Mr. Jesse Peter who has long been an enthusiastic archaeologist and has moreover contributed much valuable material to the archaeological groups of the University of California. Mr. Peter's archaeological work is done through the medium of student groups working under his personal direction.

The museum of Santa Rosa Junior College aims to build up a small collection of material for each county of California and for each state of the Union.

Southwestern Area

Activities in the southwest under the auspices of the University of New Mexico's Department of Anthropology during the period of June to November, 1935, as reported by Dr. Donald Brand, Acting Head, were as follows:

Another session in the Chaco Canyon was held jointly by the University of New Mexico and the School of American Research, from the 25th of June until the 10th of August, 1935. Under the direction of Dr. Reginald Fisher and Dr. Donald Brand, six graduate students, representing Radcliffe, Princeton, Southern California and New Mexico universities, continued work on a Chetro Ketl talus unit, initiated and completed the excavation of the medium sized kiva, Kin Nahazbaz, near Una Vida, and carried out surveys of the ceramic types, ethnobotany, and field and irrigation systems in the Chaco area. The ethnobotanical information was obtained from the Navajo workmen on the excavations.

During the month of August the annual Jemez Field School was held in the Jemez canyon at the old pueblo and mission of Giusewa near Jemez Springs. Under the direction of Dr. A. O. Bowden of the University of Southern California, and Dr. Donald Brand (in the absence of Dr. Hewett), some thirty students, representing over a dozen institutions, attended classes in natural history, archaeology, ethnology, and anthropo-geography; visited the Chaco Canyon and Several Pueblo dances; and were taught the elements of excavation and museum technique in connection with the excavation of several rooms of the Jemez pueblo of Giusewa. Dr. H. Fairclough of Stanford, and Dr. N. Cameron of Johns Hopkins were among the visiting professors at the field school.

During the fall semester, Dr. E. L. Hewett, Professor of Anthropology, was in Spain, on leave-of-absence, to be a delegate to the Conference of Americanists, and to commence several writings on Southwestern archaeology which he will complete during the spring semester. Recent changes in the department have been: Dr. Donald Brand, from assistant professor to associate professor and acting head of the department; Dr. Florence Hawley, from instructor to assistant professor; Dr. Hubert Alexander, appointed as instructor in philosophy and lecturer in linguistics; and Mr. Frank Hibben, appointed as assistant, and

Curator of the Museum of Anthropology. Dr. Reginald Fisher, assistant professor, has just completed his Ph.D. work at Southern California (June, 1935), and his thesis is off the press of the University of New Mexico in the monograph series on anthropology. The other regular member of the department is Dr. Mamie Tanquist-Miller, assistant professor.

The department is now newly housed in the recently completed administration building. Here it will be provided with a large museum hall, four laboratories for ceramics, dendrochronology, physical anthropology, and anthropogeography, several offices, an additional lecture hall, and much needed storage space for the skeletal and archaeological material that is coming in rapidly from excavations at Giusewa, Kuaua, Puaray, Paako, and Cuarai. Here in the basement will be worked up the historically important murals which were jacketed and removed from the square kiva at Kuaua. This mural work is made possible through federal aid, and the anonymous donation of $800.00 by friends in New Mexico.

Research undertakings at the Laboratory of Anthropology, Santa Fe, New Mexico, as reported recently by Mr. Jesse L. Nusbaum, then Director, and since January 1st, Superintendent of Mesa Verde National Park, were as follows:

Archaeological Survey.—Under a fund contributed for this specific purpose by Mr. Carl D. Kelly of Chicago, Dr. Mera and assistants completed the investigation of a large pit-house and a smaller structure on Capulin Creek, Rio Arriba County, New Mexico, during a two-week period in June. This project supplemented a comparable project of 1933 in which the two other identified house types of this locality were studied. Preparation of reports on these investigations is now practically completed.

Ceramic Technology Project.—Miss Anna Shepard, of the ceramic technology laboratory, has instituted research on the ceramic problems of the La Plata-Mancos drainage basins of northwestern New Mexico and southwestern Colorado at the request of Mr. Earl H. Morris of Carnegie Institution. One hundred forty-three Pueblo I, II and III selected type sherds have been thin-sectioned and analyzed to this time. Carnegie Institution is cooperating with the Laboratory in support of Miss Shepard's research on Maya pottery and that of the La Plata-Mancos drainage.

Dendro-Archaeological Survey.—From August 15 to September 4, under Department of the Interior permit, Messrs. Stallings and Stubbs conducted a small excavation in a Pueblo II-Pueblo III site in the Tesuque Valley in cooperation with the American Museum of Natural History and under special funds pledged by Mr. Lamar Hardy of New York. Miss Micheline Hardy and Mrs. Rosanna Sanderson, of New York, assisted in the excavation of this site. The objective was the testing of a refuse dump for stratigraphy of pottery types and accompanying datable charcoal. The results were very satisfactory.

Messrs. Stallings and Stubbs have, for the past summer and fall, devoted

primary attention to the working up of field notes and materials covering the excavation of Pindi Pueblo, five and one-half miles southwest of Santa Fe. Mr. Stallings has additionally dated 125 new specimens of tree-ring material from nineteen sites in New Mexico.

The sixteenth annual meeting of the Southwestern Division of the American Association for the Advancement of Science was held at Flagstaff, Arizona, April 27th to 30th, inclusive. In the Southwestern Division, the Social Science Section is almost wholly given over to papers of anthropological nature, the thirty-three subjects listed on the program representing a wide range of interests. A highlight of the session was a symposium of eight papers on Prehistoric Agriculture, under the chairmanship of Dr. Donald Brand, University of New Mexico. Out-of-Division participants in this symposium were Dr. Paul Weatherwax, Indiana University, and Dr. James H. Kempton, Bureau of Plant Industry, U. S. Department of Agriculture (read *in absentia*) whose papers dealt with the highly important and interesting topic of maize origin; Mr. Volney H. Jones, Museum of Anthropology, University of Michigan, presented a paper summarizing the data on aboriginal Southwestern cotton, and Drs. G. W. Hendry and M. K. Bellue, University of California and California State Department of Agriculture, respectively, submitted a paper dealing with the botanical analysis of adobe bricks as shedding light on the agricultural history of the Southwest, which was read by title.

Institutions represented by authors, exclusive of those given in the above symposium, were: Colorado College, Denver Art Museum, Gila Pueblo, Laboratory of Anthropology, Mesa Verde Museum, Museum of Northern Arizona, San Diego Museum, School of American Research, University of Arizona, University of Chicago, Denver University, and the University of New Mexico.

On April 26th, the Third Annual Tree-Ring Conference, with Dr. A. E. Douglass as chairman, convened as an associated organization of the Southwestern Division.

Timed to coincide with the Flagstaff meeting was the opening of the new home of the Museum of Northern Arizona, of which Dr. Harold S. Colton is the Director. This museum, located several miles north of Flagstaff on the Fort Valley road, offers the visitor an interesting and instructive series of exhibits covering such subjects as archaeology, ethnology, geology, and biology. It is a pleasure to use this medium in extending congratulations to Dr. Colton and his staff on the successful completion of this project.

During the first week of May, Mr. Earl H. Morris, Carnegie Institution, and Dr. Emil W. Haury, Gila Pueblo, made a trip to the Redrock Valley of extreme northeastern Arizona to collect timbers for tree-ring dating from ruins previously excavated by Morris. A large series from these sites had already been sent to Dr. A. E. Douglass for study, but with reports that wood was being removed by zealous individuals for the manufacture of book shelves, etc., it was thought best to make additional collections, for the use of the several institu-

tions interested in tree-ring analysis, before it became too late. Over 150 selected specimens were gathered, nearly all of which were definitely associated with houses of Basketmaker III horizon.

Mr. Odd S. Halseth, director of a research laboratory at Pueblo Grande, sponsored by the city of Phoenix, has the following to offer regarding the institution:

As usual, the digging season at Pueblo Grande closed with the coming of summer weather, and it is hoped that the accumulated laboratory work can be cleaned up before spring rolls around again. The building program is completed, but already there is a lack of space.

Due to the many-sided aspects of this project, the excavations have progressed slowly. The original plans of reconstructing rooms on different levels are still being followed and for that reason we want to make sure we don't destroy any features which are to be incorporated as exhibits. With at least six filled in floor levels, and each with a different floor plan, this presents some slight problems, especially as we want to connect the rooms with galleries showing the stratigraphical structure of the mound.

Another question yet to be decided by excavation is whether we will leave the reconstructed rooms open for the public to enter, or place a large window in each wall along a connecting gallery, thus making a showcase of each room.

Archaeologically the season has produced nothing new. We still insist that the structure is Hohokam in origin rather than Pueblo. It never was more than one story high, though that story was raised some thirty feet by successive stages of filling in the lower levels and rebuilding, and none of these levels show any indications, so far, of domestic use. Only the last abandoned top level was used for dwellings, and even this we believe is Hohokam, in spite of the associated inhumations and polychrome pottery.

A questionnaire survey conducted this season shows that the average visitor to archaeological sites has not received the proper instructions in the fundamentals of anthropology in either school or museum. We have turned our results over to the National Park Service, whose problems in visual education are identical to ours, and who are eager to develop direct ways of serving the public through exhibits, talks, and publications. Our method is to make the visitor comfortable in a reading room with printed survey sheets, writing material, and some suggestive objects to make him start putting down his own questions. A check is made by each of age group and education, and the questions are tabulated on cards with every word copied verbatim. The results show that those of us who are not privately endowed have a real obligation to the great American public. As educators we are not very far ahead of most school teachers, and who but archaeologists should teach the subject to the public? At the present time we seem to favor only the pot-hunter in educational matters.

This winter Julian Hayden joined our staff in a temporary capacity and it

is hoped that his position may be made more permanent before the start of the next digging season. We have used workmen from the C.C.C. the last two seasons, and have found them quite satisfactory. We tried P.W.A. men for a while, but turned them loose after a short trial. We also have had R.F.C. and F.E.R.A. crews on the job, but we never used them for digging.

Great Plains Area

Dr. Forrest Clements of the Department of Anthropology, University of Oklahoma, is supervising the work of an archaeological field crew at a village site south of Hugo, Oklahoma, on the Red River. The work is being actively directed by James Durham. Initial findings, materials uncovered by a plow, raise the question of a culture related to that of the Ouachita area in Arkansas and that of the Red River area in Texas. Working conditions are reported favorable and the site promises a considerable quantity of materials.

The Nebraska State Historical Society expedition went into the field early in May and has been excavating burial mounds and house sites on the Platte River near Fremont. The work to date suggests that secondary mound burial was practiced at this locality by peoples of possible Woodland affiliation. The party, which is in charge of Director A. T. Hill, expects to move up the river to Bellewood and, subsequently, to Palmer on the Loup River for several weeks of excavation in historic, nineteenth century Pawnee sites. Thereafter, if time and funds permit, some work will be done on the Elk Horn. Dr. Waldo R. Wedel expects to spend possibly three months in a surface reconnaissance of Nebraska and Kansas, or at least as much of this central plains area as time will allow. This reconnaissance will be sponsored by Gila Pueblo, Arizona.

Dr. Earl Bell and the University of Nebraska expedition planned to leave about the first of June for work in the northeastern part of the state on the lower Niobrara River and Ponca Creek. The first part of the work was to be carried on at a very large prehistoric village site of unknown cultural affiliation. The second portion was planned for an apparently historic Ponca site on Ponca Creek near the Missouri River. The report by Dr. Bell and students on field work carried on by the University since Dr. Strong's departure has gone to press and should appear late in the summer or some time in the fall.

In May, Mr. Hill and Dr. Wedel were called to a prehistoric burial mound near Weeping Water and assisted local archaeologists in its excavation. The mound contained a series of five pits; each contained remains of two or three secondary burials and was covered with limestone slabs. Another layer of slabs had been placed over the entire group, apparently, Some few fragments of pottery were found but no complete vessels. Burial in the flesh was found in one pit. This burial mound, to judge from the associated sherds, belongs to a village site about one-quarter of a mile away on Weeping Water Creek. It is hoped to excavate house sites in this village next fall

Northern Mississippi Area

A joint expedition of the University of Wisconsin and the Milwaukee Public Museum, under the supervision of Dr. Ralph Linton, Professor of Anthropology, University of Wisconsin, and the personal direction of W. C. McKern, Curator of Anthropology, Milwaukee Public Museum, will continue the work in northwestern Wisconsin started last summer. A group of Hopewellian mounds in Barron County, where clay masks have been found associated with cremations of secondary burials, will be further investigated, and a large mound in Burnett County, similar to that on the shores of Clam Lake excavated last year, and an adjacent village site, will be subjected to study later in the season.

It is expected that the rather limited information on the Red Cedar River focus of the Hopewellian phase now available will be materially augmented, and that additional data on the new Woodland manifestation discovered last season, productive of the largest mounds in the state, will be secured.

Northeastern Area

An apparently new culture manifestation in New York State is coming to light near Orient, in eastern Long Island, as the result of investigations by Mr. Roy Latham, a member of the New York State Archeological Association. Since 1935 two hill-top sites overlooking Long Island Sound, one-eighth mile apart, have been excavated.

The first of these sites produced twenty-five grave pits, 35 to 53 inches in depth, beneath a surface devoid of signs of occupation. No bones occurred on this site, and it is quite certain from the conditions observed on Site Two, presently to be mentioned that the bodies had been cremated.

Every pit contained artifacts of a distinctive character, embracing steatite vessels; quartz and slate arrowpoints with relatively narrow blades and concave-stem bases; spearheads or knives of the same type, made of flint and jasper; perforators; rude rectangular celts and plano-convex adzes of felsite; rubbed hematite and graphitic paint stones; two-holed gorgets; cylindrical pestles; and lumps of decomposed iron pyrites, undoubtedly parts of fire-making sets. Although the projectile points and other artifacts are remarkably uniform in type the steatite vessels present a wide diversity in size and shape, ranging from flat-bottomed, low-sided utensils to bowl-shaped receptacles, and from 6 to 16 inches in length. Every one has been "killed" or broken. In some cases this consisted only in knocking a small hole through the bottom. "The objects," says Mr. Latham, "were neatly arranged in the pits, and would average about one steatite utensil, one celt, one knife, one each of red and dark pigment stones, and eight quartz arrow points to a grave. Drills, pestles, gorgets, and other odd pieces, were not of regular occurrence in the graves, but the remains of firemaking sets were found in all."

The second site, which overlooks the sound from an elevation of 170 feet, had at its summit "a large oval pit, 20 by 25 feet, the long axis east and west, with two large fireplaces at each end. The depth of these hearths was more than 60 inches, and the average thickness of the disturbed soil between them 50 inches. The hearths contained a few firestones, and much charcoal, and a quantity of fragmentary calcined bones, which were determined at the Rochester Museum of Arts and Sciences as representing two cremations of human subjects. Between and around these large crematory hearths were scattered many stemmed quartz and slate arrowpoints, large blades of chert and jasper, a few drills, a small grooved adze, a two-holed gorget, and several one-holed disc pendants, In addition to these over 130 sherds of steatite were taken from the pit."

Mr. Latham, who is still excavating this second site, remarks the total absence of the triangular arrow point, and of pottery, pipe, shell, and bone implements, and states that while the objects he is finding occur as scattered surface finds over most of Long Island, not a single specimen has ever been taken from the later shell-pit producing village sites.

Most of Mr. Latham's material has been examined by William A. Ritchie, of the Rochester Museum of Arts and Sciences, who thoroughly agrees with the finder that the complex is an importation from New England. The distinctive fish-tailed points, and steatite and felsite cutting tools have been recorded as sporadic surface finds from eastern, and occasionally even from western New York, but Mr. Latham's discoveries are revealing the content and burial traits of this important manifestation to which the name Orient focus of the Vine Valley aspect has been provisionally given.

In western New York, Dr. A. C. Parker and Mr. Wm. A. Ritchie of the Rochester Museum of Arts and Sciences are still on the trail of the Archaic occupants of the state. In July the field work will be extended to the St. Lawrence valley, in the hope of discovering stations of the little known Ground Slate phase.

Messrs. Douglas Byers and Frederick Johnson of Phillips Academy, Andover, are busy with problems of culture progression and chronology in New England. Recently located sites may enable a subdivision of Willoughby's "Pre-Algonkian" into several aspects.

Mr. George G. Heye announces that the Museum of the American Indian, Heye Foundation, will resume its work of the past several seasons on the burial site opposite Fort Ticonderoga on the Vermont shore of Lake Champlain. It was here that Mr. Godfrey Olsen found two superposed cemeteries of the same people, separated by a one-half foot layer of sterile water-laid clay. Native copper beads, stone and clay tubes, and other significant types have been recovered. Mr. Olsen continues in active charge.

A new site on the New York side of the lake, not far from the fort, will also be examined this summer.

Pennsylvania is undergoing a very vigorous scrutiny this year. Dr. Mary Butler, on leave of absence from the University of Pennsylvania Museum, is supervising PWA field work for the Pennsylvania Historical Commission. She reports definite evidences, especially in the western part of the state, of the Archaic occupation, and the Vine Valley and Owasco aspects as described in New York. No traces of the Ground Slate phase of the upper northeastern area have been observed, but burial mounds in the southeastern part of Erie County and elsewhere suggest connections with Ohio. Iroquoian remains are the most prominent.

Mr. Harlan I. Smith, of the National Museum of Canada, has been unremittent in his labors of compiling, analyzing, and classifying information on the sites and subjects of Canadian archaeology. His data now crowd forty drawers in ten filing cabinets.

On June 17 and 18 the summer session of the American Association for the Advancement of Science will convene in Rochester. The program of Section H contains some fifteen papers, chiefly on the archaeology and ethnology of the northeastern area. The meetings will be held at the University of Rochester and the Rochester Museum of Arts and Sciences.

Middle American Area

Drs. J. Alden Mason and Robert H. Merrill are (March 1st) in the state of Durango, Mexico. The main object of their expedition is a search for ancient man on more or less the Folsom horizon, a grant of funds for this purpose having been made by the American Philosophical Society. To date four caves have been examined with disappointing results; in no case was the floor deposit of sufficient depth to indicate the age sought for, and little if any differentiation was noted between the highest and lowest levels. No projectile point resembling the Folsom type has yet been reported in Mexico.

As a side issue, the recent pre-Columbian archaeology of this almost unknown region has been investigated. As expected, the culture was obviously considerably inferior to that of the regions farther south, and deteriorates in quality from south to north. The well-known site of Chalchihuites, not far to the southeast in the state of Zacatecas, is apparently the northernmost large and important site so far known of the higher cultures of southern Mexico. No example of indubitable pre-Columbian masonry has yet been seen in Durango, and no sherd of the fine cloisonné pottery characteristic of Chalchihuites, La Quemada and other sites of that region has been seen. Pottery figurines, so characteristic of southern Mexico, seem to be entirely lacking. In general aspect, however, the culture seems to have been quite Mexican with no obvious tendencies

towards that of Casas Grandes in Chihuahua, the southernmost Puebloan outpost.

The sites in this region are found most frequently on isolated hills near streams. Low terraces are seen on the slopes, which become low mounds on the summit. These contain house sites which are often outlined by rectangular lines of elongated stones planted deeply in the ground. Excavations in the interior are likely to reveal broken metates and mullers and occasional burials, sometimes apparently in urns and accompanied by small pottery vessels, ornaments of copper and of shell, spindle-whorls and similar objects.

There is, however, a noticeable differentiation in quality of artifacts from south to north. In several sites around the city of Durango the proportion of legs and other parts of tripod vessels, handles apparently of ladles or censers, and of painted pottery is rather large. Both the shape of the tripod vessels and the nature of the painted decoration, geometric designs in fine lines in red on a yellow surface, show close resemblance to the pottery of Chalchihuites. Other sites showing these characteristics were seen farther north at Guatimape and at Hervideros, nearly up to Santiago Papasquiaro. At Hermideros was seen a fine example of black pottery with incised-line decoration, very rare in this region, copper earplugs, shell gorgets, and the the like. Farther north, in the region of Zape, the pottery is mainly plain, buff, red or black, and tripod bowls seem to be very rare. Painted pottery also seems to be rare, and while it is red on yellow as farther south, decorative designs seem to be rare, coarser and executed with less care.

The site of Zape, reported by Guillemin-Tarayre in 1870 and frequently mentioned in the archaeological literature of Mexico, was especially examined and found to be no more than a large typical site of this region. Tarayre's description is not misleading if read cirtically, but his published plan is rather idealized. The low mounds and lines of stones are only approximately oriented to north and south. The site has been much dug up and former details destroyed, including the masonry structure reported to have existed in the center of the court, so that it was impossible to decide whether it was pre-Columbian or modern.

Apart from the work herein reported, probably the most interesting recent results seen in Mexico were those of the excavations of Dr. Isabel Kelly of the University of California near Culiacan on the west coast. Strangely, the aspect of the objects seems to resemble the culture of the west coast of Costa Rica and Nicaragua more than it does anything in Mexico.

On January 27th, 1936, Dr. A. V. Kidder, Chairman of the Division of Historical Research, Carnegie Institution of Washington, opened a conference on Maya Ceramics in the Institution's Guatemala Office; those attending were: Dr. Kidder, Chairman; Señor Don Eduardo Noguera of the Dirección de Arqueología, Mexico; Edith B. Ricketson, Oliver G. Ricketson, Henry Roberts, A. L. Smith, R. E. Smith, all of the Carnegie Institution of Washington; George C. Vaillant of the American Museum of Natural History, and Robert Wauchope

of the Carnegie Institution of Washington. It had been hoped that J. Eric Thompson could have attended, but he was prevented from doing so by the illness of his child.

The conference sat formally from 9 to 12 A.M. daily, devoting the afternoons to informal discussion. The agenda consisted of the following points, with special relation to the Middle American field: (1) Ceramic nomenclature and classification; (2) Definitions of ceramic terms; (3) Outline of future aims and methods.

A mimeographed résumé of the work of the conference will be prepared and made available for workers in the Middle American field. It is the hope of the conference that this résumé will be found applicable generally within the area, and that, whether accepted in its present form or modified by future trial and error, it will result in a much-needed standardization of ceramic terms.

Upon the closure of the conference, January 31st, a visit was made to Zacualpa, in the Department of El Quiché, to inspect the excavations being carried out there by the Carnegie Institution of Washington, under the direction of Robert Wauchope. A great mass of ceramic material is being recovered at this site; the apparent variety of the material inspires the hope that final study may reveal important ceramic cross-connections.

An examination of a mound belonging to the Miraflores-Arevalo group will shortly be undertaken by the Institution under the direction of Oliver G. Ricketson, Jr. This mound contains within it an earlier construction believed to be a stucco-faced platform or pyramid. Knowledge of this condition, hitherto not reported from this site, was supplied by Mr. Carlos Villacorta, Director de Arqueología, after examining a cut made across the east face of the mound in order to enlarge a football field.

During December 1935, the Institution's contract was renewed by the Government of Guatemala for a further period of five years; the excavation at Uaxactun, initiated in 1926 under the terms of this contract, will therefore be continued, under the direction of A. Ledyard Smith, who left for the field February 8th. The Institution plans to bring the work at this important site to a close with the completion of the 1937 field season, and to publish the second report in 1939. The first report is now in press.

Other workers affiliated with the Institution are Drs. Sol Tax and Manuel Andrade, now carrying out linguistic and ethnological studies of the Lake Atitlán region. Expected shortly is Dr. Lila O'Neale, who will investigate the Indian textiles.

Although in Honduras, and therefore separate from the Guatemala Office, archaeological work is being carried out by the Institution at the ruins of Copan under the direction of Gustav Stromsvik, assisted by Aubrey Trik. The Honduras Government is cooperating extensively with the Institution and has installed a landing field for aeroplanes. As a result, air trips to Copan from Guatemala City are now frequently planned by groups of ten. The round trip

fare is $20.00 apiece, less than the cost overland; flying time, one way, 60 minutes. No passports or visas are required by the Honduras Government, provided the passengers arrive and leave by the same plane.

Dr. Kidder, after a two weeks visit at Zacualpa, plans a visit to Copan by air, and to various archaeological sites in the Highlands. He plans to remain in Guatemala until April.

Ceramic material from San Agustín Acasaquastlán, Miraflores and Salamá is now being classified in the laboratory.

South American Area

The field session in Latin American studies, under the direction of Dr. E. L. Hewett, was primarily a reconnaissance of parts of Peru and Bolivia. A party of nineteen, mainly from southern California and New Mexico, devoted the whole summer to this field survey of Andean archaeology. Ten days were spent in study and investigations at Lima, including visits to the important coastal ruins of Cajamarquilla, Pachacamac, and Ancon. The Andes were traversed and Lake Titicaca crossed to afford some time in Bolivia, at La Paz and the ruin of Tiahuanaco. Then the expedition moved to Cuzco, Peru, where five weeks were spent in research. Such ruins as Machu Picchu, Ollantaytambu, Pisac and Sacsahuaman were studied; native villages were visited; and constant use was made of the library, museum and laboratory facilities which were generously made accessible for the group. The return voyage allowed for stops at Guayaquil and Manta, Ecuador, and several days in Panama.

Early Man in America

Plans for the summer of 1936 promise considerable activity in the investigations pertaining to the subject of Early Man in North America. According to present information submitted by Dr. Frank H. H. Roberts, Jr., several institutions will be engaged in this line of research.

Dr. E. B. Howard of the University Museum, University of Pennsylvania and the Philadelphia Academy of Natural Sciences, will supervise a number of projects. One of these, sponsored by the University Museum and the Academy, will be concerned with exploration in several caves in the eastern slopes of the Guadalupe Mountains in southeastern New Mexico. It was in a cave in this area that Dr. Howard found a Folsom point associated with musk ox bones in a stratum underlying a Basketmaker level. Work will be resumed at the gravel pit and old lake basins between Portales and Clovis, New Mexico, where Howard previously obtained Folsom artifacts and mammoth, bison and other animal bones. This project will be a joint effort of the Carnegie Institution of Washington and the Academy of Natural Sciences. Late in the summer a party consisting of Dr. Howard, Dr. Ernst Antevs, Dr. Paul V. MacClintock of Princeton University, and Dr. Hellmut de Terra of Yale University, will make

a reconnaissance of the sites in Nebraska, Colorado, South Dakota, and Montana where traces attributed to Early Man have been found. This group will devote itself mainly to a consideration of the geology of the various locations where finds have been made. The Carnegie Institution of Washington is sponsoring this investigation.

A party from the Nebraska State Museum, Lincoln, under the direction of C. Bertrand Schultz on June 1 began excavating a site in the White River drainage north and west of Crawford, Sioux County, Nebraska. Late in the summer of 1935 Schultz and his associates found artifacts associated with fossil bones at this location. The specimens occur in a carbon-stained soil zone which in some places lies 25 feet beneath the present surface. In addition to bones and artifacts there are many hearth pits in the same layer. So far, worked flakes have been few and far between, but "flint" chips occur by the thousands and it is hoped that more extensive excavation will yield a good series of tools. At a nearby site, which Mr. Schultz says may prove to be a continuation of the first, typical Yuma points were found. These were also deeply buried. In a preliminary study of the area last summer, Dr. Paul V. MacClintock and Schultz determined that some of the deposits were the varves of an old lake bed. Similar deposits are very extensive, continuing several hundred miles to the east. Certain evidence suggests that the "lake" may have been of glacial origin, but this still has to be established. If such can be done, it will be of tremendous significance because some of the varved deposits extend above the artifacts and the fossil bones at several sites. Dr. MacClintock will join the party later in the season and with Schultz will endeavor to solve the problem of the old "lake."

The Bureau of American Ethnology, Smithsonian Institution, will continue its investigations at the Lindenmeier Site in northern Colorado. Plans for the summer call for the investigation of two portions of the site which evidence obtained in the excavations during the summer of 1935 indicates may have been a part of the actual camping grounds of the group formerly inhabiting the region. Two additional sites in the same general district will be inspected. Both of these were discovered by Colorado amateurs and reported to the Institution with a request that members of the field party at the Lindenmeier Site visit and study the locations with a view to future work. One of these has yielded a characteristic Folsom complex, while the other contains only the so-called Yuma type of point. Both of these locations may prove to be significant additions to the list of sites attributable to early occupancy in the Plains area.

During the spring months Mr. and Mrs. Campbell of the Southwest Museum Laboratory, Twenty Nine Palms, California, conducted further investigations in the Mohave Desert sites where they have been finding stone implements under conditions which suggested considerable antiquity. They no doubt will have further interesting announcements to make in the near future when they have had an opportunity to study their latest finds.

The 7th report covering the Archaeological Survey of the High Western Plains, under the directorship of Dr. E. B. Renaud of the University of Denver, has recently appeared. Dr. Renaud's findings of flints on ancient river terraces in southwestern Wyoming which on a typologicai basis, can be ascribed to Early and Late Chellean, Acheulean, Clactonian, and Mousterian, will be of great interest to those engaged particularly in the study of early man in America. Dr. Renaud further reports, "It is the first time that such a clear association of lithic cultures has been recognized and reported for this part of the world. Very similar finds have been made by the Oriental Institute of Chicago in Nubia and Upper Egypt for Africa, and by the Yale-Cambridge India Expedition in Punjab, for Asia."

Dr. A. E. Jenks, Professor of Anthropology, University of Minnesota, will take his ninth summer-session class into the field for ten or eleven weeks digging. Plans are that the party will work along the eastern and western Campbell beaches of Glacial Lake Aggasiz in an effort to obtain more information looking toward a solution of the so-called Ivory Culture problem. Burial elephant ivory from Minnesota, North Dakota and South Dakota has opened a large field of possibilities relating to Early Man in North America, and further information on the subject will be of interest to all concerned with the field of American archaeology.

BOOK REVIEWS

The Archaeological Survey of the High Western Plains Seventh Report, Southern Wyoming and S-W. South Dakota. E. B. RENAUD. (University of Denver, Department of Anthropology, Denver, 1936.)

This publication of the University of Denver, Colorado, is primarily a report on field work in southwestern Wyoming. The last few pages of the bulletin are devoted to a brief review of different sites near Edgemont, South Dakota, and will not be considered here.

The river sites in southwestern Wyoming on which the author reports are all located in the vicinity of the little town of Lyman. They are, without exception, surface sites. Although from the descriptions given it is nearly impossible to obtain a clear picture of the physiographic features of the district, it seems that the main highway, U. S. 30-s, runs over an extensive, fairly flat to slightly undulating surface. Below this lies the present bottom of Black's Fork and above it, especially to the southeast and northeast, rise bluffs. The artifacts are found not only scattered about the level on which the highway is located, but also on the slopes and the tops of the neighboring bluffs.

The nearly 1100 artifacts gathered in this area are of chert, moss agate and quartzite. The author treats the entire quantity obtained according to statistical methods, with considerable emphasis upon accuracy, all of his percentages running into two decimals. He does not, however, explain why he considers it feasible to treat the finds from these nine sites as one unit.

The purposes of this statistical treatment are not clear, nor are the conclusions based upon it convincing. It is claimed that the quartzite artifacts, which occur in practically all sites, are younger than those made of chert and agate, because they are sharper, are not patinated and consist by two-thirds of flakes, whereas of the cherts and agates, two-thirds are bi-faced artifacts and only one-third are flakes.

The author's data on the differences in sharpness of the artifacts are difficult to judge without viewing the specimens. It is rather interesting though to note that where all of the chert artifacts are considered "rolled" and dull-edged, that the bulk of the chert flakes are shown to have retained the sharpness which characterizes the quartzite artifacts.

The matter of patination is open to different interpretation. While the author lays considerable stress upon the patination of the chert and moss-agate pieces, and the lack of a patina on the quartzite artifacts, on page 16 of the bulletin he admits that "quartzite does not develop a patination like flint and chert do."

The fact that there are proportionately more quartzite than chert flakes is meaningless without stratigraphical evidence. The author's typological classification cannot be admitted as an argument since it is entirely subjective. His

nearest type sites lie beyond the Atlantic Ocean. Certainly no geologist would seriously attempt to correlate formations so far apart with fossils of doubtful index value.

In the descriptions of the sites there are some indications that the author is inclined to the belief that the "older" material is more abundant on the bluff slopes and tops, and the "younger" material on the undulating lower surface, but no attempt is made at a classification according to physiographic location. Such an attempt, however, would probably not have been very successful since it seems to us that in the majority of the sites the "old" and the "young" materials are inextricably mixed.

The foregoing, however, constitute only minor points of criticism. The most remarkable part of the bulletin is the classification of the artifacts by types. For this the author has adopted the well known terminology of western Europe "where chronological classification of culture has been achieved."

Even if it were fairly well established that early man in America and in Western Europe were approximately coeval, the use of European terms would have to be condemned upon purely technical and practical grounds. Students of the Ice Age agree that the probabilities are in favor of coevality of European and American glaciations. Nevertheless, it is generally considered advisable to continue the use of American terms for the different phases of the Ice Age in this continent.

There are not cogent reasons of a general nature which force us to believe in a similar coevality of primitive culture in the two continents. Does not the author know that even today some peoples of the Old World, as for example certain Papuan tribes, make artifacts corresponding to those of the Neolithic period in Europe? The question of the age of man in America is not definitely settled, but at present all appearances are against an antiquity as great as in Europe. Besides, the terminology used in western Europe implies a certain stratigraphic succession, and for a similar succession in Wyoming the author does not have a shred of evidence.

The conclusions reached in this part of the study are peculiar to say the least. In his surface sites the author finds a mixture of artifacts which are supposed to range from early Chellean to Mousterian. He even finds 39 implements of the "Clactonian" type!

All this is supposed to suggest "a possible very great antiquity for these artifacts from our S–W. Wyoming sites, as well as for the rest of the industry associated with them." And further: "our Wyoming specimens are closely similar to Old World industries having existed in western Europe from about 500,000 years to 50,000 years (ago) in Early Mousterian. This is highly significant in view of the fact that this is the first time that such a consistent lithic industrial or cultural complex has been found and recognized in this part of the world." The author even goes so far as to compare his study in southwestern Wyoming with those of Sandford and Arkell in Egypt and of De Terra in British India!

The entire report shows clearly to what absurd lengths a purely morphological and statistical approach can go. The author would do well to acquaint himself better with the work done in Europe, and especially with an excellent article by A. Vayson in L'Anthropologie of 1922, entitled: "L'étude des outillages en pierre," including the comments upon the article by M. C. Burkitt.

A study of some of the older American literature would show him that it is not the first time that claims have been made for the occurrence of "palaeolithic" artifacts in this continent. As early as 1897 W. H. Holmes showed that the supposed "palaeoliths" of the Washington region were blanks and rejects. In the bulletin under discussion plates 1 and 2 illustrate some of the "early palaeoliths" from Wyoming. While it is not the contention of the reviewer that these implements do not resemble the European palaeoliths, we wish to point out that identical forms are profuse in mounds and village sites throughout the Missouri-Mississippi drainage.

W. Van Royen

Excavations at Zacatenco. George C. Vaillant. (Anthropological Papers of the American Museum of Natural History, Vol. 32, Part 1: 1–198, 55 plates, 4 maps, New York, 1930.)

Excavations at Ticoman. George C. Vaillant. (Anthropological Papers of the American Museum of Natural History, Vol. 32, Part 2: 199–440, 40 plates, 18 text figs., 6 maps, New York, 1931.)

These two books are the first of a series reporting archaeological investigations in Mexico undertaken for the Division of Anthropology of the American Museum of Natural History by Dr. Vaillant, and later by Dr. and Mrs. Vaillant. The third volume of the series, *Excavations at Gualupita*, recently reviewed in this journal, was published in 1934; the fourth and fifth, *Excavations at El Arbolillo*, and *Early Cultures of the Valley of Mexico: Results of the Stratigraphical Project of the American Museum of Natural History in the Valley of Mexico, 1928–1933*, appeared late in 1935. They comprise the first systematic, intensive investigation into the Early cultures of Mexico, probably the most significant field in North American archaeology at the present time. In these cultures must lie the germs of the later high civilizations of the Maya, Toltec, Zapotec, and Aztec, important not only in themselves, but for their possible influences in North, Central, and South America.

Dr. Vaillant's introduction to *Excavations at Zacatenco* might well serve for the whole series in its general philosophical discussion of the type of work involved, and its specific statement of the problem to be solved. In this Introduction Dr. Vaillant points out that there are two phases of archaeology:—one, the reconstruction of the life of a people, of interest to any reader; the other, the establishing therein of an historical sequence, the technical problems of which are of interest only to the specialist. He then discusses the development of ceramic stratigraphical study, the method of such a specialist, since it is the

present basis of New World archaeological chronologies. This form of research, first established in the southwestern United States by Nelson and Kidder, "showed that, with a shaky mythology as the only previous time medium, it was possible by 'dirt' archaeology to bring out a history rich and full, instructive to the layman, as well as to the specialist within the field." The climatic, economic, and social conditions that made the Southwest ideal for the application of pottery stratigraphy as an historical yardstick were not duplicated in early Mexico. It is none the less true that pottery sequence, allowing for all its limitations, is the best tool available for classifying and correlating the remains of the many peoples who lived in that region in pre-Columbian times.

A statement of the work already done in Middle America from 1907 to 1928 shows that its omissions as well as its commissions emphasized the need for an intensive study of the earliest remains there, the "Archaic" material which, though homogeneous in technique, is heterogeneous in typology, and infinitely more complex than had at first been realized. The Division of Anthropology of the American Museum of Natural History decided to tackle the problem. The Valley of Mexico seemed the most suitable spot in which to begin work and, as a result of preliminary investigations by Dr. Vaillant in 1928, a site was chosen at Zacatenco, near Guadalupe, Hidalgo, a suburb of Mexico City.

Excavations were undertaken here during the winter of 1928–29 on a spur jutting out from a range of hills and covered with debris of occupation on its southeastern slopes, which were formerly washed by Lake Texcoco, before its partial drainage by the Spaniards in the sixteenth century. Although this deposit had been somewhat disturbed by an Aztec building and by colonial and modern road-making, it proved to be the deepest bed of continuous Early culture debris as yet encountered. Trenches were dug at strategic points, and a stratigraphical study of varying types in the pottery vessels and figurines found established three main periods of occupation.

Remains from the Early Period show us a people living probably "on the lower slopes of the hill, on the borders of the lake, which was very much lower then than in Aztec times. As their refuse beds increased, the inhabitants utilized them as living surfaces, terracing the soft banks with large boulders." They made good pottery vessels, and vigorous pottery figurines, modelled by hand, with features and details of costume rendered by incising or applied fillets of clay. These figurines, characteristic of Early cultures in Middle America, "are too well made to be toys, too uniform to be portraits," and seem unconnected with fertility or burial rites. They may represent deities, not yet highly specialized. The early Zacatencanos used lava to make manos and metates with which to grind their maize, and obsidian to make arrowheads and knife blades. They must have had many bone and wooden tools to supplement these stone ones, but only a few pieces of worked bone have been preserved in the damp soil. They knew weaving, since they had pottery spindle whorls and made figurines that occasionally are represented as wearing clothing and twisted turbans. One small piece of textile was found, made not of cotton but of a fibre like henequen.

These people seem to have lived in adobe houses, to have had dogs, and to have eaten a good deal of bird and deer meat as well as the inevitable maize. They buried their dead in shallow graves, with little regard to orientation or position of the body.

In the Middle Period, evidence indicates that a rise in the lake level forced the Zacatencanos back to high ground above a rocky ledge. As debris collected below this ledge, they built out over the most level sections of deposit. Their culture seems to have been a normal development from that of the Early Period.

By the Late Period, the ledge had disappeared under refuse deposits which ran out in gradual slopes into the lake. The Zacatencanos of this time also kept to the high ground, terracing the hill in a rather ineffectual manner. Pottery and figurines indicate increased technical facility, and a break with Middle Period tradition. Generic traits of pottery and figurines throughout the occupation of the site show connections with other known Early sites in the Valley, such as Copilco and Cuicuilco, while trade pieces of jade and shell suggest contact with western Mexico.

"The qualitative aspects of the remains at Zacatenco are certainly far from primitive. They occupy a position midway between the High Civilizations of Mexico and undiscovered primitive developments like the Basket Makers of the Southwestern United States. Although lacking a rich ceremonial art, the inhabitants of Zacatenco give every evidence of a culture that is completely developed, so far as the utilitarian arts are concerned."

During the winter of 1929–30, excavations were undertaken at Ticoman, a site about two miles from Zacatenco, which had provided surface finds similar in type. Ticoman, before the draining of Lake Texcoco by the Conquerors, had been a rocky peninsula jutting out into the water from the range of hills in which Zacatenco is located. The main evidence of occupation lies on the north and northeastern slopes of the hill, above the rocky strip which connects it with the main chain. The first Ticomanos lived high up on the hill, terracing and living on the debris which accumulated on the slopes before them, moving down to the lake shores in the Intermediate Period, and back to the hillside in the Late Period. Their material culture, though analogous to that of Zacatenco, was richer and more homogeneous in character.

Considering the two sites in their relations to each other, Dr. Vaillant decides that the culture of which Early Zacatenco is an example was widely diffused through the Valley of Mexico, and that Middle Zacatenco is a development from it apparently due to fusion with another ethnic group. "Late Zacatenco appears without transitional stages indicative of evolution or culture fusion, the inference being that these people either pushed out the Middle Zacatencanos or occupied the site after it had been abandoned by them." Since Late Zacatenco material is identical with that from Early Ticoman, the implication is that the Ticomanos had occupied Zacatenco before settling at Ticoman itself. It is probable that the latter site was occupied for a much shorter time than the former, and "that a single people developed their culture

at Ticoman without accretions from other culture groups." Dr. Vaillant stresses the importance of environmental factors in solving archaeological problems. The indicated rise of level of Lake Texcoco shown in Middle Zacatenco and Early Ticoman, and the lava flow that covered Copilco and Cuicuilco, sites related to the Zacatenco-Ticoman complex, are important not only for their potentialities for dating and correlating cultures on which they left their mark, but also as the motivating cause for migrations, intrusions, and fusions of peoples. The work done so far can be summed up in the following sequence, which puts the latest period first, and provides a relative chronology, to be expanded and given greater depth and meaning by further research: I, Aztec; II, Toltec (San Juan Teotihuacan type); III, (1) Late Ticoman (Cuicuilco), (2) Intermediate Ticoman, (3) Early Ticoman-Late Zacatenco (?); IV, Middle Zacatenco (Copilco); V, Early Zacatenco.

Where did these people come from, Ticomanos and Early Zacatencanos with already well-developed cultures that have no discovered roots in the Valley of Mexico? There is as yet no answer to that question nor to the problem of absolute dating.

It is interesting to see in the second of these books the clarification of technique that results from the work done on the first. The general discussion in each embodies detailed description of the methods of excavation followed and the resulting finds. This is followed by a description of the objects found, grouped according to material, subdivided, wherever possible, according to period, and profusely illustrated by drawings and photographs. Maps, tables, and diagrams are used wherever possible, carrying out the excellent idea that a picture is the best known form of description. In method of excavation, in intensive and exhaustive exposition of the results of excavation, and in illuminating and scholarly historical interpretation of those results, Dr. Vaillant's books should be an inspiration to archaeologists.

MARY BUTLER

Excavations at El Arbolillo. GEORGE C. VAILLANT. (Anthropological Papers of the American Museum of Natural History, Vol. 35, Part 2: 136–279, 28 figs., New York, 1935.)

In this fourth paper of the series reporting his excavations of prehistoric Early culture sites in central Mexico for the American Museum of Natural history, at Zacatenco, Ticoman, Gualupita (Anthropological Papers of the American Museum of Natural History, Vol. 32, parts 1, 2, 1930–31, Vol. 35, Part 1, 1934), Dr. Vaillant deals with material that intensifies and expands the results of his work at Zacatenco.

El Arbolillo is the name used for a site, on the northern edge of the township of Ticoman in the Federal District of Mexico, that was excavated by Dr. Vaillant in 1931. It is one of the chain of early dwelling sites, lying along the eastern shore of a former arm of Lake Texcoco, which includes Zacatenco and Ticoman. There are no important Aztec remains in this region, but abundant

evidence of occupation in the "Archaic" period. El Arbolillo lies on gently rolling ground in the northern curve of a half circle of foot-hills, open to the sun and sheltered from the winds.

Its people lived at the edge of the lake, raising corn and building houses of wattle and daub. They made pottery and figurines like those found at Zacatenco in the Early and Middle periods established at that site. These periods, called at the new site El Arbolillo I and II, are the earliest in Dr. Vaillant's sequence of Early Zacatenco, Middle Zacatenco, and Early, Intermediate, and Late Ticoman. As work at Ticoman showed that Late Zacatenco could be subdivided into Early, Intermediate, and Late Ticoman, so work at El Arbolillo showed that Early Zacatenco could be divided into Early, Intermediate, and Late El Arbolillo I. The basis for this classification is variation in figurine types, in which the slow development from El Arbolillo I to II showed also that Early and Middle Zacatenco were successive phases of the same culture, and that there was no sharp break between them, as had formerly been thought. Artifacts of the Teotihuacan period represent the third cultural phase at El Arbolillo, but are not discussed in this paper, as Dr. Vaillant is preparing a report on *Teotihuacan Culture Sites in the Valley of Mexico.*

The most important find at El Arbolillo was a series of sixty-three burials, many of them with furniture. El Arbolillo people buried their dead, flexed or extended, directly in the soil or in slab tombs, without any specific orientation. Their funeral furniture, like that of Zacatenco and in contrast to that of other Mexican cultures, lacked figurines. It included a use of the red paint that is found on skeletons from Maine to Mexico and beyond.

The graves can be grouped into four periods: Teotihuacan, El Arbolillo II, and Late and Early El Arbolillo I. The most richly endowed burials are those of Late El Arbolillo I, found usually in an extended position in a slab tomb. Jade beads and earplugs found with skeletons add to the corpus of jade objects from Early cultures that suggest trade with the Oaxaca-Guerrero region to the south. Shell ornaments bear out the associations of Zacatenco shells with the west coast of Mexico in distinction to Ticoman shells which tend to come from the Gulf of Mexico. Turquoise fragments, probably from a mosaic, and iron pyrites occur for the first time in Early cultures.

El Arbolillo adds to the data for absolute dating of the Early cultures. On the basis of the far-from-primitive character of the Zacatenco-Ticoman material culture, and the fact that a historical sequence, of which the accuracy has already been checked by archaeology, gives the date of 600 to 750 A.D. for the founding of Teotihuacan, Dr. Vaillant suggests a date of 250 B.C. to 500 A.D. for the Zacatenco-Ticoman development. The period of duration of the Early cultures is based on comparison of their refuse heaps with the dated ones in the Pueblo ruin of Pecos.

Dr. Vaillant has made a painstaking investigation of the geological evidence relevant to this matter of dating, going to the extent of having a survey run across the Valley of Mexico to find out whether the prehistoric variation in

level of Lake Texcoco indicated at Zacatenco and Ticoman might be correlated with evidence at the Early sites of Cuicuilco, Copilco, and San Juanico. His conclusions are that no such correlation is possible in view of the frequent local and general floods in the Valley of Mexico; and that sedimentary deposits and lava covering archaeological specimens are in themselves no evidence of age.

The work done at El Arbolillo is interesting, as commented on by the author, in its reflection of the problems of the archaeological method. Dr. Vaillant, although basing his studies on pottery criteria, had, in classifying his burials, which contained a number of complete pottery vessels, to rely largely on type of interment and stratigraphical position. This was because the pottery vessels on which he had based his periods at Early sites were heretofore in the form of sherds, requiring a different treatment from that used in dealing with whole pots. With sherds, the study is a percentage one showing the variation from one period to the next in quantity of wares determined primarily by surface color; with whole vessels, found usually in burials, the emphasis is on type rather than quantity since the range of wares for any one period is incomplete, and shape assumes a far greater importance. It is sometimes possible to correlate the two methods, but Dr. Vaillant's difficulty in doing so in this instance emphasizes the fact that they are two methods, required by the diverse nature of the material.

MARY BUTLER

Early Cultures of the Valley of Mexico: Results of the Stratigraphical Project of the American Museum of Natural History in the Valley of Mexico, 1928–1933. GEORGE C. VAILLANT. (Anthropological Papers of the American Museum of Natural History, Vol. 35, Part 3: 281–328, New York, 1935.)

This report presents the history of archaeological research in central Mexico as a background for a résumé of the work done there from 1928 to 1933 by the American Museum of Natural History.

According to native traditions as related in post-Conquest times, the country was formerly inhabited by giants. By the nineteenth century paleontological studies in Europe had reached the point where the bones of these giants were recognized to be those of mammoths, and investigations in Middle America followed the European trend of interest in fossil man. The paleontological approach, which tried to find remains of man or his handiwork that showed age qualitatively, faded out in the early twentieth century, due mainly to Hrdlička's disqualification of early skeletal material, and the proof that crude stone tools were by no means paleolithic.

The geological approach, which tried to find human remains under geological conditions that guaranteed their age, gradually developed by 1910 into the archaeological method of today, when the objects found are studied and compared on the basis of their intrinsic qualities and their associations. Work done by Mexican and American scientists established three groups of archaeological material: belonging to the Aztecs, the people of Teotihuacan who preceded

them, and the still earlier people whose homes were covered by the Pedregal lava flow. The latter were characterized as archaic, and Dr. H. J. Spinden advanced the hypothesis that they were responsible for the basic agricultural occupation level from northern Mexico to Brazil.

The next step was a refinement of the archaeological approach by an emphasis on ceramic stratigraphy that carried to a new field the methods worked out in the southwestern United States since 1912. Theoretical objections to the "Archaic" theory, analytical studies of early material in Central America and the Maya area adjacent to Mexico, and in Mexico itself, led to the initiation of a systematic and intensive program of stratigraphical research by the American Museum of Natural History, centering on sites of the Early or "Archaic" cultures of Mexico.

Of the five field seasons considered here, the first was devoted to reconnaissance and an evaluation of the "Archaic" problem, and the second to excavation of the site of Zacatenco and the establishing there of three time periods: Early, Middle, and Late Zacatenco. In the third season, the material at Ticoman, a nearby site, was found to resemble and to subdivide Late Zacatenco, and for the latter term were substituted Early, Intermediate, and Late Ticoman. The fourth season's work at El Arbolillo established there El Arbolillo II, equivalent to Middle Zacatenco, and showed that El Arbolillo I, equivalent to Early Zacatenco, could be divided into Early, Middle, and Late periods. In the fifth season, excavations were undertaken at Teotihuacan and at Gualupita, Cuernavaca, Morelos, where the material found carried the Early culture sequence on another period to Gualupita III, later than Late Ticoman. Correlation with other known Early sites permitted the definition of three culture groups: those of Zacatenco-Copilco and Ticoman-Cuicuilco in the Valley of Mexico, and that of Gualupita in Morelos, and established through their interrelations a culture sequence for the "Archaic" peoples of the Valley of Mexico that ties on to the traditional Toltec of Teotihuacan. Incidentally, work carried on by Mexican archaeologists has shown that the terms Toltec and Aztec are almost as inadequate for covering the complexities of the higher civilizations of Mexico as "Archaic" was for the early peoples.

Interpretation of all these archaeological data by traditional and historical information tends to lessen the antiquity of any dating suggested for the fairly sophisticated Early cultures. It emphasizes the need of finding remains of the primitive people who must have preceded them, and the need of establishing an absolute chronology in Mexico, and of correlating it with the prehistoric cultures of adjacent areas. It may then be possible to discard much of the scaffolding of detail now necessary in archaeological method, and to restate our information in terms of the human elements involved. "Unless archaeology is going definitely to shift from a branch of anthropology to an obscure type of mathematics, an effort must be made to relate the rhythms of cultural development with the pulsations of an evolving human society."

MARY BUTLER

SOME RECENT PUBLICATIONS

UPPER NORTH AMERICA

Berry, J. Brewton, Archaeological Resources and Research in Missouri. Southwestern Social Science Quarterly 16, No. 4, 6 pp., 1936.

Brannon, Peter A., The Southern Indian Trade. 29 Illustrations, Montgomery, Ala., 1935.

Brown, Chas. E., Indian Fords of the Rock River. Wisconsin Archeologist, N.S., Vol. 15, No. 4: 69–73, January, 1936.

Brown, Chas. E., Curve-tailed Panther Mounds. Wisconsin Archeologist, N.S., Vol. 16, No. 1: 10–15, April, 1936.

Butler, Amos W., An Old Indian Peace Medal. Indiana Magazine of History 31, No. 4, December, 1935.

Cadzow, Donald A., Archaeological Studies of the Susquehannock Indians of Pennsylvania. (Safe Harbor Report No. 2.) Publications of the Pennsylvania Historical Commission 3, 218 pp., 141 plates, 9 maps and charts, Harrisburg, 1936.

Colton, Harold S., Stages in Northern Arizona Prehistory. Museum Notes 8, No. 1, Flagstaff, Arizona, 1935.

Crawford, Kenneth, A Brief Sketch of the Mandan Indians. (Including archaeological notes.) Minnesota Archaeologist 2, No. 3: 1–5, Minneapolis, March, 1936.

Crawford, Lewis F., Flint Quarries on Knife River. Minnesota Archeologist 2, No. 4: 1–4, Minneapolis, April, 1936.

Fast, John E. and Caywood, Louis R., Life Figures on Hohokam Pottery. (Southwest.) Southwestern Monuments Monthly Report, pp. 187–190, 5 plates, March, 1936.

Freckman, Kermit, Additional Pleasant Lake Mounds. Wisconsin Archeologist, N.S., Vol. 15, No. 4: 74–81, January, 1936.

Greger, Darling K., The Use of Discoidals. Missouri Archaeologist 2, No. 1, Columbia, January, 1936.

Hargrave, Lyndon L., The Jeddito Valley and the first Pueblo Towns in Arizona to Be Visited by Europeans. Museum Notes 8, No. 4, Flagstaff, Arizona, 1935.

Haury, Emil W., Vandal Cave. (Arizona.) The Kiva 1, No. 6, Tucson: Arizona State Museum, February, 1936.

Householder, G. D., A survey of Pettis, Morgan and Cooper Counties. (Missouri.) Missouri Archaeologist 2, No. 1, Columbia, January, 1936.

Howard, Edgar B., Evidence of Early Man in America. Museum Journal 24, Nos. 2–3: 61–158, 1935.

Ives, Ronald L., A Trinchera near Quitovaquita, Senora. (Mexico-Arizona border.) American Anthropologist, N.S., Vol. 38, No. 2: 257–259, April, 1936.

Knudsen, John J., Archaeological Investigations in Wisconsin in 1935. Wisconsin Archeologist, N.S., Vol. 16, No. 1: 17–19, April, 1936.

Lewis, T. M. N., Archaeological Survey and Research Forms. University of Tennessee, Department of American Archaeology, Knoxville, 1936.

McGregor, J. C., Additional Houses Beneath the Ash from Sunset Crater . . . (Southwest.) Museum Notes 8, No. 5, Flagstaff, Arizona, 1935.

Renaud, E. B., The Archaeological Survey of the High Western Plains: Southern Wyo-

ming and Southwestern South Dakota. (Seventh Report.) 2 plates, Denver: University of Denver, Department of Anthropology, 1936.

Ritchie, Wm. A., New Evidence Relating to the Archaic Occupation of New York. Researches and Transactions, The New York State Archeological Association 8, No. 1, 24 pp., 14 plates, Rochester: Lewis H. Morgan, Chapter, 1936.

Schaefer, V. J., Canajoharie; Report of the Second Annual Conference of the Mohawk Valley Historical Societies. (Northeast.) New York State Archeological Association, Van Epps-Hartley Chapter Bulletin 1, No. 4, April, 1936.

Southwest Museum, Annual Meeting Report. The Masterkey 10, No. 2, Los Angeles: Southwest Museum, March, 1936.

Stirling, M. W., Peachtree Mound and Village Site. Archaeological Society of North Carolina Bulletin 3, No. 1: 1–3, Chapel Hill, North Carolina, April, 1936.

Stoner, Victor R., Reconnaissance of Tonto. (Arizona.) Southwest Monuments Monthly Report, pp. 304–310, April, 1936.

Ulke, Titus, Additions to Our Knowledge of Indian Habitations and Workshops Located at Washington, D. C., and Vicinity. Primitive Man 8, No. 3: 67–71, July, 1935.

University of New Mexico Bulletin, Field Seasons in Anthropology, 1936, with the School of American Research. Vol. 49, No. 2, Albuquerque: University of New Mexico Press, 1936.

Walker, Edwin F., A Ceremonial Site at Porter Ranch, San Fernando. (California.) The Masterkey 10, No. 3: 98–104, Los Angeles: Southwest Museum, May, 1936.

Wedel, Waldo R., Salina 1: A Protohistoric Village Site in McPherson County, Kansas. Nebraska History Magazine 15: 239–256, 1934.

Wedel, Waldo R., Minneapolis 1: A Prehistoric Village Site in Ottawa County, Kansas. Nebraska History Magazine 15: 210–239, 1934.

Wedel, Waldo R., Contributions to the Archaeology of the Upper Republican Valley, Nebraska. Nebraska History Magazine 15: 133–209, 1934.

MIDDLE AMERICA

Beyer, Hermann, Zur Konkordanzfrage der Mayadaten mit denen der Christlichen Zeitrechnung, II. Zeitschrift für Ethnologie 67, Nos. 1–3: 43–49, 1935.

Beyer, Hermann, Mayan Hieroglyphs: Glyph G_8 of the Supplementary Series. American Anthropologist, N.S., Vol. 38, No. 2: 247–249, April, 1936.

Cuevas, Emilio, Las excavaciones del Templo Mayor de Mexico. Anales del Museo Nacional de Arqueología, Historia, y Etnografía, 5th. series, 1, No. 2: 253–265, April, 1934.

Guzmán, Eulalia, Los Relieves de las Rocas del Cerro de la Cantera, Jonacatepec, Morelos. Anales del Museo Nacional del Arqueología, Historia, y Etnografía, 5th. series, 1, No. 2: 237–251, April, 1934.

Mullerried, Federico K. G., Sobre Artefactos de Piedra en la Porción Oriental del Estado de Coahuila. Anales del Museo Nacional de Arqueología, Historia, y Etnografía, 5th. series, 1, No. 2: 205–219, April, 1934.

Noguera, Eduardo, Estudio de la Ceramica Encontrada en la Sitio donde Estaba el Templo Mayor de Mexico. Anales del Museo Nacional de Arqueología, Historia, y Etnografía, 5th. series, 1, No. 2: 267–281, April, 1934.

Schellhas, Paul, Die Stele Nr. 12 von Piedras Negras. Zeitschrift für Ethnologie 66, Nos. 4–6: 416–422, 1934.

Schulz, C., Zur Chronologie der Maya. Zeitschrift für Ethnologie 67, Nos. 1–3: 49–68, 1935.

Weitlaner, Irmgard, A Chinantec Calendar. (Mexico, ethnological.) American Anthropologist, N.S., Vol. 38, No. 2: 197–201, April, 1936.

GENERAL

Prehistoric American Indians Suffered from Syphilis. Science News, Science 83, No. 2155: 7, April 17, 1936.

SOCIETY FOR AMERICAN ARCHAEOLOGY MEMBERSHIP, 1935

LIFE AFFILIATES

Bliss, Robert Woods	Dumbarton Oaks, Georgetown, Washington, D. C.
Fulton, William Shirley	Waterbury, Connecticut
Kraft, J. L.	400 Rush Street, Chicago, Illinois
Nelson, N. C.	American Museum of Natural History, New York City
Trumbull, Mrs. Walter	75 Central Park West, New York City
Vaillant, George C.	American Museum of Natural History, New York City

AFFILIATES

Alden, John	512 So. State St., Ann Arbor, Michigan
Aldrich, Richard	69 Jackson Street, Tucson, Arizona
Allen, George X.	202 Raymond Ave., Bay City, Michigan
Allen, Hugh S.	2307 Cedar St., Bakersfield, California
Allen, J. Robin	Amarillo Gas Co., Amarillo, Texas
American Antiquarian Society,	Worcester, Massachusetts
American Museum of Natural History, Library	New York City
Amsden, Charles	The Southwest Museum, Los Angeles, California
Anderson, A. E.	Box 189, Brownsville, Texas
Anderson, C. C.	R. D. 1, Oregonia, Ohio
Andrews, Van	808½ Commercial Avenue, Cairo, Illinois
Arizona State Teachers College, Library	Flagstaff, Arizona
Bailey, John H.	363 Lake Avenue, Rochester, New York
Bain, Irma L.	122 McDowell Road, Lexington, Kentucky
Baker, Isabelle Roddey	2200 Beverly Drive, Charlotte, North Carolina
Baker, William E.	Boise City, Oklahoma
Baldwin, Gordon C.	1038 East 4th Street, Tucson, Arizona
Barnett, H. G.	Department of Anthropology, University of Calif., Berkeley, California
Barrett, S. A.	Public Museum, Milwaukee, Wisconsin
Bartlett, Katherine	Museum of Northern Arizona, Flagstaff, Arizona
Beals, Ralph L.	2555 Patricia Street, Los Angeles, California
Beard, Roland E.	Goliad, Texas
Bell, Earl H.	Social Science Building, Lincoln, Nebraska
Bennett, Wendell C.	American Museum of Natural History, New York City
Berne, Albert	Box 4458, Madeira, Ohio
Berry, Brewton	University of Missouri, Columbia, Missouri
Beyer, Hermann	Tulane University, New Orleans, Louisiana
Black, Glenn A.	815 Oakland Avenue, Indianapolis, Indiana
Blackmer, Beverly	Big Canyon Ranch, Pyramid Lake, Nevada

Blom, Frans	Department of Middle American Research, Tulane University, New Orleans, Louisiana
Boekelman, H. J.	Department of Middle American Research, Tulane University, New Orleans, Louisiana
Bonnewitz, Lee R.	666 South Washington, Van Wert, Ohio
Boudeman, Donald O.	234 South Burdick Street, Kalamazoo, Michigan
Brame, J. Y.	604 First National Building, Montgomery, Alabama
Brand, Donald D.	University of New Mexico, Albuquerque, New Mexico
Branegan, James	501 Gainesboro Road, Drexel Park, Drexel Hill P. O., Pennsylvania
Brannon, Peter A.	P. O. Box 404, Montgomery, Alabama
Brate, Kenneth C.	1069 Waverly Place, Schenectady, New York
Brew, J. O.	Peabody Museum, Cambridge, Massachusetts
Brewer, J. W., Jr.	Flagstaff, Arizona
Brown, Charles E.	2011 Chadbourne Avenue, Madison, Wisconsin
Bruehl, W. A. R., Jr.	907 Chamber of Commerce Building, Cincinnati, Ohio
Bryan, Frank	Box 188, Waco, Texas
Buckner, C. L.	Vine Street, Paris, Kentucky
Buckner, John L.	North Middletown, Kentucky
Bulger, Harold A.	Barnes Hospital, 600 South Kingshighway, St. Louis, Missouri
Bull, Norris L.	1565 Boulevard, West Hartford, Connecticut
Burgh, Robert	University of California, Berkeley, California
Burnett, E. K.	Museum of the American Indian, Heye Foundation, New York City
Butler, Amos W.	52 Downey Avenue, Indianapolis, Indiana
Butler, Mary	The University Museum, Philadelphia, Pennsylvania
Buttles, Lewis S.	4151 North Prospect Avenue, Milwaukee, Wisconsin
Byers, Douglas S.	Phillips Academy, Andover, Massachusetts
Cadzow, Donald A.	P. O. Box 498, Harrisburg, Pennsylvania
Cahill, Edgar	Geology Department, Skelly Oil Co., Tulsa, Oklahoma
Campbell, Elizabeth W. C.	Twenty Nine Palms, California
Campbell, William H.	Twenty Nine Palms, California
Carder, Fred, Jr.	Cordell, Oklahoma
Carrigan, P. B.	Hope, Arkansas
Caywood, Louis R.	Coolidge, Arizona
Chambers, Moreau B.	Belvedere Place, Clinton, Mississippi
Champe, John L.	525 South 13th Street, Lincoln, Nebraska
Chapman, E. M.	1120 Green Springs Avenue, Birmingham, Alabama
Chapman, Kenneth M.	Laboratory of Anthropology, Santa Fe, New Mexico
Chard, Chester S.	1–32 Winthrop House, Cambridge, Massachusetts
Charles, Tom	Alamogordo, New Mexico
Cherry, H. H.	Bowling Green, Kentucky
Cincinnati Society of Natural History	Cincinnati, Ohio
Claflin, W. H., Jr.	74 State Street, Boston, Massachusetts
Clements, Forrest E.	University of Oklahoma, Norman, Oklahoma

Coe, Joffre L.	University of North Carolina, P.O. Box 652, Chapel Hill, North Carolina
Colburn, Burnham S.	Biltmore Forest, Biltmore, North Carolina
Colburn, William S.	333 Washington Road, Gross Pointe, Michigan
Cole, Clarence	416 South 4th Street, Ironton, Ohio
Cole, Fay-Cooper	Department of Anthropology, University of Chicago, Chicago, Illinois
Collier, William Dean	1402 South Grand, St. Louis, Missouri
Collins, Henry B., Jr.	U. S. National Museum, Washington, D. C.
Colton, Harold S.	Museum of Northern Arizona, Flagstaff, Arizona
Congdon, A. Barton	Wilbur and Natick Avenues, Oak Lawn, Rhode Island
Cooper, John M.	Catholic University of America, Washington, D. C.
Cosgrove, C. B.	Peabody Museum, Cambridge, Massachusetts
Cotter, Jack	Room 400, College Hall, University of Pennsylvania, Philadelphia, Pennsylvania
Cox, Irwin W.	4655 East 17th Avenue Parkway, Denver, Colorado
Cressman, L. S.	University of Oregon, Eugene, Oregon
Cresson, Frank M.	126 Valley Road, Ardmore, Pennsylvania
Cron, C.	Miami, Arizona
Crozier, Archibald	Kennett Square R. F. D., Pennsylvania
Cummings, Byron	University of Arizona, Tucson, Arizona
Cummings, Malcolm B.	Smoki Public Museum, Prescott, Arizona
Davidson, D. S.	University of Pennsylvania, Philadelphia, Pennsylvania
Day, H. Summerfield	P.O. Box 413, Williamsburg, Virginia
DeJarnette, David L.	Alabama Museum of Natural History, University, Alabama
Dellinger, S. C.	University of Arkansas, Fayetteville, Arkansas
Department of Archaeology	Phillips Academy, Andover, Massachusetts
Department of Archives and History	The Capitol, Jackson, Mississippi
Deuel, Thorne	Department of Anthropology, University of Chicago, Chicago, Illinois
Dickinson, S. D.	State A. and M. College, Magnolia, Arkansas
Dilley, G. W.	672 Hillsdale Avenue, Akron, Ohio
Dillingham, Thomas J.	907 South Second Street, Boonville, Indiana
Dodge, V. K.	137 Bell Court West, Lexington, Kentucky
Dominican House of Studies	Harlem Avenue at Division Street, River Forest, Illinois
Dormon, Caroline	Chestnut, Louisiana
Dorrance, Frances	69 South Franklin Street, Wilkes-Barre, Pennsylvania
Douglas, Frederic H.	1300 Logan Street, Denver, Colorado
Drake, William A.	46 Cottage Street, Jersey City, New Jersey
Duane, W. North	Montecito, Santa Barbara, California
Duffen, William A.	631 East 2nd Street, Tucson, Arizona
Dunbar, Helen M.	1621–28th Street, San Diego, California
Dustin, Fred	705 South Fayette Street, Saginaw, W.S., Michigan
Eggan, Fred	Department of Anthropology, University of Chicago, Chicago, Illinois

Eiseley, Loren C.	1910 South 23rd Street, Lincoln, Nebraska
Ekholm, Gordon	1414 Lincoln Avenue, St. Paul, Minnesota
Elliott, R. A.	Dallas, South Dakota
Elmore, Francis H.	647 East 35th Place, Los Angeles, California
Elrod, Henry E.	Petroleum Building, Houston, Texas
Ely, Lancelot	128 West High Street, Somerville, New Jersey
Estabrook, Mrs. H. K.	92 Reservoir Street, Chestnut Hill, Massachusetts
Evans, Laurence M.	1018 Tomlinson Avenue, Moundville, West Virginia
Evans, U. B.	Alexandria, Louisiana
Ewing, E. C.	Wheeling Steel Corporation, Wheeling, West Virginia
Fairbanks, Charles	3 Greenlawn, Bainbridge, New York
Fallon, Bernard B.	1305 Thomas Street S. E., Grand Rapids, Michigan
Farmer, Malcolm F.	4357 West 63rd Street, Los Angeles, California
Fenstermaker, G. B.	R. 5, Lancaster, Pennsylvania
Fenton, William N.	Box 452, Akron, New York
Ferguson, Alice L. L.	2330 California Street, Washington, D. C.
Fesmire, Vincent R.	Huntingdon Valley, Pennsylvania
Field, Clark	Field Stationery Company, Tulsa, Oklahoma
Finkelstein, Joseph	228 West 9th Street, Bristow, Oklahoma
Fischel, Hans	2221 Dwight Way, Berkeley, California
Fisher, Harry M.	Metropolitan Building, St. Louis, Missouri
Fisher, J. Sheldon	Fishers, New York
Fisher, Reginald G.	School of American Research, Santa Fe, New Mexico
Fisher, Warren R.	Carlisle, Kentucky
Fleming, Mrs. Thomas E., Jr.	1541 Lombardy Road, Pasadena, California
Ford, James A.	Louisiana State University, Baton Rouge, Louisiana
Ford, Lee M.	Great Falls National Bank, Great Falls, Montana
Fordyce, John R.	Hot Springs, Arkansas
Foster, James Russell	Wellington Arms, Lexington, Kentucky
Franke, Paul R.	Mesa Verde National Park, Mancos, Colorado
Frederiksen, Victor	347–15th Avenue, Columbus, Ohio
Funkhouser, W. D.	University of Kentucky, Lexington, Kentucky
Gann, Thomas	The Shrubbery, La Roque, Jersey Channel Islands
Gayer, Albert	58 Willow Avenue, Schenectady, New York
Gayton, Anna H.	108 Livingston Street, New Haven, Connecticut
Geist, Otto Wm.	University of Alaska, College, Alaska
Geological Survey of Canada Library	Ottawa, Ontario, Canada
Getty, Harry T.	University of Arizona, Tucson, Arizona
Gifford, E. W.	Museum of Anthropology, University of California, Berkeley, California
Gilder, Robert F.	P. O. 2318 N. Street, Omaha, Nebraska
Gilmore, G. H.	Murray, Nebraska
Ginnane, E. S.	1016 Martin Building, Birmingham, Alabama
Gladwin, Harold S.	Gila Pueblo, Globe, Arizona
Glenn, L. C.	Vanderbilt University, Nashville, Tennessee
Godbey, Allen H.	816 Fourth Street, Durham, North Carolina
Goddard, Charles F.	Mattituck, Long Island, New York

Godfrey, Marion Angell	Ardmore, Pennsylvania
Gomes, Lloyd H.	2290 Telegraph Avenue, Berkeley, California
Green, Amos R.	Eau Claire, Michigan
Green, G. G., Jr.	43 North Woodland Avenue, Woodbury, New Jersey
Green, George G. III	43 North Woodland Avenue, Woodbury, New Jersey
Green, Thomas L.	1410 Fifth Avenue, Scottsbluff, Nebraska
Greenman, Emerson F.	University Museums Building, Ann Arbor, Michigan
Greywacz, Kathryn B.	940 Riverside Avenue, Trenton, New Jersey
Griffin, James B.	University Museums Building, Ann Arbor, Michigan
Grimes, J. Gordon B.	Shiprock, New Mexico
Guernsey, E. Y.	1410 O Street, Bedford, Indiana
Guernsey, Samuel J.	Peabody Museum, Cambridge, Massachusetts
Guthe, Carl E.	University Museums Building, Ann Arbor, Michigan
Hall, Will L.	6219 Rosebury Avenue, St. Louis, Missouri
Halseth, Odd S.	Pueblo Grande Monument, Phoenix, Arizona
Harbican, Alma L.	1322 Hill Street, Ann Arbor, Michigan
Harrington, M. R.	The Southwest Museum, Los Angeles, California
Hart, George E.	Lynbrook, New York
Harvey, Reuben	Edison, Ohio
Haury, Emil W.	Gila Pueblo, Globe, Arizona
Hawksley, Frederick A.	81 Burnside Street, Cranston, Rhode Island
Hawley, F. G.	Box 351, Miami, Arizona
Hawley, Florence M.	University of New Mexico, Albuquerque, New Mexico
Hayden, Mary Jane	87th and Brooklyn, Kansas City, Missouri
Heard, Mrs. Dwight	Phoenix, Arizona
Heard Museum	22 East Monte Vista Road, Phoenix, Arizona
Heizer, Robert	2645 LeConte Avenue, Berkeley, California
Herskovits, Melville J.	Northwestern University, Evanston, Illinois
Hill, A. T.	P.O. Box 100, Capitol Building, Lincoln, Nebraska
Hill, Roland B.	229 Main Street, Oneonta, New York
Hodge, F. W.	The Southwest Museum, Los Angeles, California
Holden, W. C.	Texas Technological College, Lubbock, Texas
Hooton, E. A.	Peabody Museum, Cambridge, Massachusetts
Horton, Edgar C.	1221 North 13th Street, Birmingham, Alabama
Householder, J. C.	812 North Oxford Street, Indianapolis, Indiana
Howard, Edgar B.	Bryn Mawr, Pennsylvania
Hulburt, Milton F.	Lock Box 502, Reedsburg, Wisconsin
Hurst, C. T.	Southwestern Colorado Archaeological Society, Gunnison, Colorado
Hysler, Alvin	2212 South 10th Street, Springfield, Illinois
Indiana State Library	Indianapolis, Indiana
Jackson, A. T.	University of Texas, Austin, Texas
Jenks, A. E.	University of Minnesota, Minneapolis, Minnesota
Jenness, Diamond	National Museum of Canada, Ottawa, Ontario, Canada
Johnson, Elmer H.	Bureau of Business Research, University of Texas, Austin, Texas
Johnson, Frederick	Phillips Academy, Andover, Massachusetts
Jones, Paul A.	Lyons, Kansas

Jones, Volney H.	University Museums Building, Ann Arbor, Michigan
Jones, Walter B.	Alabama Museum of Natural History, University, Alabama
Judd, Neil M.	U. S. National Museum, Washington, D. C.
Kastner, Alfred L.	2903 W. McKinley Road, Milwaukee, Wisconsin
Kavanaugh, Charles N.	190 North Upper Street, Lexington, Kentucky
Keech, Roy A.	Museum of New Mexico, Santa Fe, New Mexico
Kelly, Arthur R.	143 Laurel Avenue, Macon, Georgia
Kent, Edward G.	9 Highland Avenue, Madison, New Jersey
Kercher, Robert A.	2814 Victoria Avenue, Hyde Park, Cincinnati, Ohio
Keyes, Charles R.	Mt. Vernon, Iowa
Kidder, A. V.	Lock Drawer 77, Andover, Massachusetts
Kidder, Alfred II	Peabody Museum, Cambridge, Massachusetts
Kidder, Barbara	Andover, Massachusetts
King, Bernice M.	1015 South Cedar Lake Road, Minneapolis, Minnesota
Kinietz, Vernon	114 Colorado Avenue, Detroit, Michigan
Kluckhohn, Clyde	Peabody Museum, Cambridge, Massachusetts
Kniffen, Fred B.	Louisiana State University, Baton Rouge, Louisiana
Knowles, N., Jr.	432 Bolsord Boulevard, Wynnewood, Pennsylvania
Knox, Mertice M. C. Buck	123 South Avenue 53, Highland Park, Los Angeles, California
Krall, J. J.	Tyndall, South Dakota
Krieger, Alex D.	2543 Piedmont Avenue, Berkeley, California
Kroeber, A. L.	University of California, Berkeley, California
Krogman, Wilton M.	11480 Hessler Road, Cleveland, Ohio
Kuhm, Herbert W.	1710 West North Avenue, Milwaukee, Wisconsin
Kunkel, L. N.	Weeping Water, Nebraska
Laboratory of Anthropology	Santa Fe, New Mexico
deLaguna, Frederica	Pima Agency, Soil Conservation, Sacaton, Arizona
Lamb, George F.	State Historical Society Museum, State Capitol Building, Lincoln, Nebraska
Lancaster, J. A.	Ackmen, Colorado
Langford, George	c/o McKenna Process Company, Joliet, Illinois
Latham, Roy	Orient, New York
Leh, Leonard L.	838 Fourteenth Street, Boulder, Colorado
Lemley, Harry J.	Hope, Arkansas
Lesser, Alexander	Columbia University, New York City
Lewis, T. M. N.	University of Tennessee, Knoxville, Tennessee
Lillard, J. B.	Sacramento Junior College, Sacramento, California
Lilly, Eli	Indianapolis, Indiana
Linne, Sigvald	Etnografiska Museet, Stockholm 14, Sweden
Linton, Ralph	328 Sterling Hall, University of Wisconsin, Madison, Wisconsin
Lister, Robert	Kappa Alpha House, University of New Mexico, Albuquerque, New Mexico
Lothrop, S. K.	1061 Madison Avenue, New York City
Lowie, Robert H.	University of California, Berkeley, California
McArthur, Fred	Oakland, Iowa

McCown, B. E.	1718 South Sixth Street, Ironton, Ohio
McCready, Delphine B.	540 N. Sheridan Avenue, Pittsburgh, Pennsylvania
McGregor, John C.	Box 1, Flagstaff, Arizona
McKern, W. C.	Public Museum, Milwaukee, Wisconsin
McMahon, Alphonse	806 Missouri Building, St. Louis, Missouri
Macpherson, George A.	Ravensford, North Carolina
Macpherson, J. Havard	349 West State Street, Trenton, New Jersey
Madeira, Percy C., Jr.	Real Estate-Land Title Trust Company, Philadelphia, Pennsylvania
Magre, Frank P.	Highway No. 61, Crystal City, Missouri
Mahr, Adolph	National Museum, Dublin, Ireland
Martin, Leslie A.	4 Chateau Apartments, Charleston, West Virginia
Martin, Paul S.	Field Museum of Natural History, Chicago, Illinois
Marye, William B.	207 East Preston Street, Baltimore, Maryland
Mason, J. Alden	The University Museum, Philadelphia, Pennsylvania
Mason, Samuel, Jr.	Darlington, Maryland
Matson, Frederick R., Jr.	University Museums Building, Ann Arbor, Michigan
Maude, F. H.	700 Cotton Exchange Building, Los Angeles, California
Maxwell, W. S.	120 McDowell Road, Lexington, Kentucky
Mera, H. P.	Laboratory of Anthropology, Santa Fe, New Mexico
Meyer, Julius A.	3461 Louisiana Avenue, St. Louis, Missouri
Miller, P. Schuyler	302 South Ten Broeck Street, Scotia, New York
Miner, Horace	114 Waller Avenue, Lexington, Kentucky
Mitchell, Mrs. Charles M.	123 North Sixth Street, Monroe, Louisiana
Montgomery, Ross G.	3828 Amesbury Road, Los Angeles, California
Mook, Maurice A.	Ohio Wesleyan University, Delaware, Ohio
Moorehead, Warren King	Department of Archaeology, Andover, Massachusetts
Morgan, Richard	Ohio State Museum, Columbus, Ohio
Morris, Earl H.	P.O. Box 500, Boulder, Colorado
Murry, Margaret W.	25 East Lexington Avenue, Phoenix, Arizona
Museum of the American Indian,	Heye Foundation, Broadway at 155th Street, New York City
Mynter, Kenneth H.	8 Greenport Parkway, R. D. #1, Hudson, New York
Nash, Charles	Waverly, Tennessee
Neff, George H.	Hotel Neff, Sunbury, Pennsylvania
Neild, Edward F.	City Bank Building, Shreveport, Louisiana
Nesbitt, Paul H.	Beloit Museum, Beloit, Wisconsin
Neumann, Georg K.	737 North Latrobe Avenue, Chicago, Illinois
Neville, Keith	Box 336, North Platte, Nebraska
Newark Free Public Library	5 Washington Street, Newark, New Jersey
Newberry Library	60 West Walton Place, Chicago, Illinois
New Jersey State Museum	State House Annex, Trenton, New Jersey
Nichols, E. T.	725 North Park Avenue, Tucson, Arizona
Noble, Thomas B., Jr.	1008 Hume Mansur Building, Indianapolis, Indiana
Northwestern University Library	Evanston, Illinois
Nusbaum, Deric	Pecos Road, Santa Fe, New Mexico

Nusbaum, Jesse L.	Mesa Verde National Park, Mancos, Colorado
Okkelberg, Peter	1220 Fair Oaks Parkway, Ann Arbor, Michigan
Olmstead, Julian	University of New Mexico, Albuquerque, New Mexico
Olsen, Godfrey J.	Fort Ticonderoga Museum, Fort Ticonderoga, New York
Olson, Ronald	University of California, Berkeley, California
Orchard, Frederick P.	Peabody Museum, Cambridge, Massachusetts
Osgood, Cornelius B.	Peabody Museum, Yale University, New Haven, Connecticut
Over, W. H.	University of South Dakota Museum, Vermillion, South Dakota
Palmatary, Helen C.	Arrott Arms, Frankford, Pennsylvania
Parker, Arthur C.	Rochester Museum of Arts and Sciences, Rochester, New York
Parks, Charles M.	Plainview, Texas
Parsell, Stuart	Jerseyville, Illinois
Parsons, Elsie Clews	Harrison, New York
Pasco, George L.	Ripon, Wisconsin
Paton, Edward D.	Duncan Avenue, Paris, Kentucky
Patterson, Isabel Garrard	"Wildwood," Columbus, Georgia
Peabody Museum Library	Yale University, New Haven, Connecticut
Peacock, Charles K.	203 Pound Building, Chattanooga, Tennessee
Pearce, J. E.	University of Texas, Austin, Texas
Pearsall, Leigh M.	101 West Broad Street, Westfield, New Jersey
Pendray, G. Edward	491 Westchester Avenue, Crestwood, New York
Pennypacker, Samuel W. II.	240 West Tulpahocken Street, Germantown, Pennsylvania
Pershing, B. H.	Wittenberg College, Springfield, Ohio
Petit, George	2526 North 14½ Street, Terre Haute, Indiana
Pfirman, Kenneth	347 East 17th Street, Erie, Pennsylvania
Philhower, Charles A.	303 Mountain Avenue, Westfield, New Jersey
Phillips, Philip	Twin Elms, East Aurora, New York
Pinkley, Frank	Casa Grande Museum, Coolidge, Arizona
Pipkin, Herman C.	Texas Bar Association, Amarillo, Texas
Pollock, Harry E. D.	909 Tower Building, Washington, D. C.
Postel, A. Williams	University of Pennsylvania, Philadelphia, Pennsylvania
Prentice, Royal A.	521 Third Street, Tucumcari, New Mexico
Proskouriakoff, Tatiana	67 Fairview Avenue, Lansdowne, Pennsylvania
Provinse, John H.	University of Arizona, Tucson, Arizona
Pullin, Joseph A.	Pacific, Missouri
Purves, William K.	Sacramento Junior College, Sacramento, California
Quimby, George I., Jr.	Zeta Psi House, Ann Arbor, Michigan
Quinlan, Joseph J.	15 Clay Street, Dansville, New York
Rainey, Froelich G.	University of Alaska, College, Alaska
Ray, Cyrus N.	Abilene, Texas
Reed, Erik K.	1707 Surrey Lane, N.W., Washington, D. C.
Reedsburg Public Library	Reedsburg, Wisconsin
Reiter, Paul	Museum of New Mexico, Santa Fe, New Mexico

Renaud, E. B.	Department of Anthropology, University of Denver, Denver, Colorado
Renno, E. L.	104 North Fourth Street, St. Charles, Missouri
Ricketson, Oliver G., Jr.	12 Calle Oriente No. 7, Guatemala City, Guatemala
Ridington, A. Blair	4485 Olive, St. Louis, Missouri
Risinger, M. E.	Huron, South Dakota
Ritchie, William A.	Rochester Museum of Arts and Sciences, Rochester, New York
Robbins, Maurice	25 Payson Street, Attleboro, Massachusetts
Roberts, Frank H. H., Jr.	Bureau of American Ethnology, Washington, D. C.
Rogers, Malcolm J.	The San Diego Museum, San Diego, California
Roop, W. P.	426 Harding Avenue, Woodbury, New Jersey
Rose, Robert H.	Coolidge, Arizona
Rouse, Irving	Peabody Museum, Yale University, New Haven, Connecticut
Roys, Lawrence	825 Twenty-seventh Street, Moline, Illinois
Roys, Ralph	1447 Harwood Street, Vancouver, B.C., Canada
Ruste, L. Gerhard	Montrose, South Dakota
San Diego Scientific Library	Balboa Park, San Diego, California
Satterthwaite, Linton, Jr.	The University Museum, Philadelphia, Pennsylvania
Sayles, E. B.	Gila Pueblo, Globe, Arizona
Sayre, H. Melville	School of Mines, Butte, Montana
Schaefer, Vincent J.	2637 Augustine Avenue, Schenectady, New York
Schellbach, Louis	333 Hilgard Hall, University of California, Berkeley, California
Schenck, Egbert	Twenty Nine Palms, California
Schulte, Dorothy L.	University Museums Building, Ann Arbor, Michigan
Scott, Donald	Peabody Museum, Harvard University, Cambridge, Massachusetts
Setzler, Frank M.	U. S. National Museum, Washington, D. C.
Shetrone, H. C.	Ohio State Museum, Columbus, Ohio
Singer, Ernestine Wieder	1512 Diamond Street, Philadelphia, Pennsylvania
Smith, Benjamin L.	64 Sudbury Road, Concord, Massachusetts
Smith, Frasier	Parkview Lane, Wheeling, West Virginia
Smith, Frederick	5640 Guilford Avenue, Indianapolis, Indiana
Smith, J. Osborn	846 Colorado Street, Butte, Montana
Speck, F. G.	College Hall Box 15, University of Pennsylvania, Philadelphia, Pennsylvania
Spier, Leslie	Yale University, New Haven, Connecticut
Spinden, Ellen S.	Brooklyn Museum of Arts and Sciences, Brooklyn, New York
Spinden, Herbert J.	Brooklyn Museum of Arts and Sciences, Brooklyn, New York
Sprowls, Mary Vohl	1611½ Rodney Street, Wilmington, Delaware
Stallings, W. S., Jr.	Laboratory of Anthropology, Santa Fe, New Mexico
Steen, Charles R.	Casa Grande National Monument, Coolidge, Arizona
Stephens, B. W.	815 Broadway, Quincy, Illinois

Steward, Julian H.	Bureau of American Ethnology, Washington, D. C.
Stewart, T. B.	Lock Haven, Pennsylvania
Stone, Claude U.	540 Linn Street, Peoria, Illinois
Stranahan, D. D.	Spartansburg, Pennsylvania
Stroebel, Ralph	Saginaw, W. S., Michigan
Strong, Wm. Duncan	Bureau of American Ethnology, Washington, D. C.
Studer, Floyd V.	635 Amarillo Building, Amarillo, Texas
Swanton, John R.	Bureau of American Ethnology, Washington, D. C.
Swart, John A.	Hoffmans, New York
Temple, Laura	3A Serapio—Rendon 76, Mexico City, Mexico
Teyen, G. M. W.	Public Museum, Milwaukee, Wisconsin
Thomson, Francis A.	Montana School of Mines, Butte, Montana
Thomson, M. S.	921 Bell Avenue, Sheboygan Wisconsin
Throop, George R.	Washington University, St. Louis, Missouri
Thurston, Bertha Parker	The Southwest Museum, Los Angeles, California
Ticer, Will	Route 4, New Albany, Mississippi
Titterington, P. F.	212 Metropolitan Building, St. Louis, Missouri
Torrey, Howard	159 Summer Avenue, Reading, Massachusetts
Tozzer, Alfred M.	Harvard University, Cambridge, Massachusetts
Tulane University, Department of Middle American Research	New Orleans, Louisiana
Turney-High, Harry	State University, Missoula, Montana
Tyzzer, E. E.	Harvard Medical School, Boston, Massachusetts
University Museum	University of Pennsylvania, Philadelphia, Pennsylvania
University of Chicago Libraries	Chicago, Illinois
University of Denver Library,	University Park, Denver, Colorado
University of Missouri Library	Columbia, Missouri
University of Nebraska Library	Lincoln, Nebraska
University of New Mexico Library	Albuquerque, New Mexico
University of North Carolina Library	Chapel Hill, North Carolina
University of Washington Library	Seattle, Washington
Van Epps-Hartley Chapter	New York State Archeological Association, 13 Union Street, Schenectady, New York
Van Osdol, D. D.	Rushville, Indiana
Van Royen, Wm.	Box 1260, Station A, Lincoln, Nebraska
Voegelin, C. F.	Department of Anthropology, Yale University, New Haven, Connecticut
Waendelin, Sv.	The Dan-American Archives Society, Aalborg, Denmark
Wagner, Sallie R.	Leatherwood Lane, Wheeling, West Virginia
Walker, Edwin F.	The Southwest Museum, Los Angeles, California

Walser, Paul H.	Neil P. Anderson Building, Fort Worth, Texas
Wardle, H. Newell	Sharon Hill, Pennsylvania
Warnock, C. O.	4325 Park Avenue, Indianapolis, Indiana
Watkins, Frances E.	The Southwest Museum, Los Angeles, California
Webb, Wm. S.	University of Kentucky, Lexington, Kentucky
Wedel, Waldo R.	Nebraska State Historical Society, Lincoln, Nebraska
Weer, Paul	1808 North Delaware, Indianapolis, Indiana
Weiant, C. W.	55 West 42nd Street, New York City
Weitlaner, Robert J.	Calle Civilizacion 85, Tacubaya, D.F., Mexico
Weltfish, Gene	Columbia University, New York City
Wenning, H. F.	1512 Chamberlain Avenue, Chattanooga, Tennessee
West, George A.	229 East Wisconsin Avenue, Milwaukee, Wisconsin
Wheeler, S. M.	915 East Colorado Boulevard, Glendale, California
White, Cyrus M.	P.O. Box 41, Goliad, Texas
White, Lida Brasher	Box 773, Santa Fe, New Mexico
Whitehead, Ralph H.	Box 228, Boston, Pennsylvania
Wilford, Lloyd A.	Department of Anthropology, University of Minnesota, Minneapolis, Minnesota
Will, George	Bismarck, North Dakota
Williamson, Ten Broeck	Box 1017, Albuquerque, New Mexico
Wintemberg, W. J.	National Museum of Canada, Ottawa, Ontario, Canada
Wissler, Clark	American Museum of Natural History, New York City
Witte, A. H.	Henrietta, Texas
Wolff, Eldon G.	Public Museum, Milwaukee, Wisconsin
Wood, Erwin F.	Public Museum, Milwaukee, Wisconsin
Wood, Nelson D.	512 Brookside Avenue, Wayne, Pennsylvania
Woodle, Abby Jane	412 Tome Street, Ridley Park, Pennsylvania
Woodward, Arthur H.	333 Hilgard Hall, University of California, Berkeley, California
Woolford, Sam	The San Antonio Light, San Antonio, Texas
Wright, Ross Pier	235 West Sixth, Erie, Pennsylvania
Wyman, Anne	522 Bradford Street, Pasadena, California